DO COMMUNITY CARE OF NORTH CAROLINA-INDUCED CHANGES SPILL OVER TO NON-TARGET POPULATIONS?

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ABSTRACT

Jesse C. Lichstein: Do Community Care of North Carolina-Induced Changes Spillover to Non-Target Populations?
(Under the direction of Mark Holmes)

A robust primary care system is necessary for the delivery of high-quality, efficient health care in the United States. Accordingly, there has been a renewed interest in primary care redesign based off the successes of innovative, primary care-based, quality improvement programs. Quality improvement initiatives target either an entire practice or a particular group within a practice. Programs such as Community Care of North Carolina (CCNC) use the latter, targeting Medicaid patients within a practice. An important policy-relevant question is whether intervention-induced changes in how providers care for a patient sub-population affect care for non-target populations within the same practice; this effect is termed spillover.

The objective of this dissertation was to examine spillover effects in CCNC, an enhanced primary care case management program for North Carolina's Medicaid population, between 2002 and 2008. It examined the extent to which NC State Employees Health Plan (SHP) diabetes patients in CCNC practices experienced greater improvements in quality of care, utilization, and SHP paid medical expenditures than SHP diabetes patients in non-CCNC practices. The central hypothesis of this study was that improvements in quality, utilization, and costs due to CCNC-induced changes in patient care also accrued among non-Medicaid diabetes patients in CCNC practices.

In the main analyses, I found evidence of spillover for only one (receipt of yearly A1c hemoglobin test) of the four quality of care measures, and two (primary care visits and total outpatient

visits) of the five utilization measures, though the effects on primary care visits and outpatient visits were not in the hypothesized direction. I found no evidence of spillover for medical expenditures.

Overall this study found minimal evidence of spillover in CCNC. The results from this study aid in understanding the full effects of the innovative primary care models that are currently a focus of health policy, and indicate that spillover is not a foregone conclusion. My findings suggest the potential need for all insurers to participate in and coordinate efforts to improve the health and health care of patients.

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CCNC	Community Care of North Carolina
SHP	State Employees Health Plan

CHAPTER 1: INTRODUCTION AND STUDY OVERVIEW

Introduction

Current health policy in the United States emphasizes the role of primary care practices in reforming and improving the U.S. health care system. This focus stems from the poor quality of care delivered by the weak and uncoordinated health care system; just half of patients receive recommended care while many patients receive contraindicated care (McGlynn et al., 2003; Mangione-Smith et al., 2007; Schuster, McGlynn, & Brook, 2005). Lack of coordination is particularly problematic for the nearly two-thirds of Americans with chronic illness (Machlin, Cohen, & Beauregard, 2008), as reflected in their having higher emergency department (ED) utilization, more inpatient hospitalizations, and four times greater health care expenditures than individuals without chronic illness (Gulley, Rasch, & Chan, 2011). With the high and rising prevalence of chronic illness in the U.S. a robust primary care system is necessary for the delivery of high-quality, efficient health care.

Consequently there has been a renewed interest in primary care redesign, based on such models as the chronic care model (Wagner et al., 2001; Bodenheimer, Wagner, & Grumbach, 2002) and the medical home model (American Academy of Family Physicians, 2007; Agency for Healthcare Research & Quality, n.d.). Both models emphasize an accessible, high-quality site of care, care coordination, and care management; the chronic care model also promotes the use of community resources and creation of community partnerships. It is widely believed that incentives to improve the quality and continuity of care delivered in primary care practices will lead to improved health outcomes and, subsequently, lower medical expenditures. This conception is built largely on early evidence of

improved outcomes and lower expenditures among patients managed by innovative, primary care-based, quality improvement programs; one such program is Community Care of North Carolina (CCNC), which manages the care of the majority of North Carolina's Medicaid population.

However, to maximize the impact of state and national health policies, we must evaluate the full effects of these innovative primary care models. Quality improvement initiatives target either an entire practice or a particular group within a practice. Programs such as CCNC use the latter, that is, targeting Medicaid patients within a practice. A critical policy-relevant question is whether intervention-induced changes in how providers care for one sub-population within a practice affects care delivered for non-target populations within the same practice; this effect is termed "spillover" (Baker, 1997; Chernew, DeCiccca, & Town, 2008; Domino, Norton, Morrissey, & Thakur, 2004). This study examines the extent to which CCNC efforts to improve the quality of care for Medicaid patients have spillover benefits for non-Medicaid patients in those practices. The degree of practice-level spillover could help public and private insurers coordinate their efforts to efficiently improve care. For example, if quality and utilization management initiatives spill over but care management does not, private insurers could supplement the quality and utilization spillover with their own care management services. Furthermore, health reform promotes other new care delivery models targeted to one payer population (e.g., Accountable Care Organizations). The presence of spillover would suggest the potential to improve the health and health care of a broader population without the participation of every health insurance provider in quality improvement.

Community Care of North Carolina

I examined spillover in CCNC, an enhanced primary care case management program for the state's Medicaid population between 2002 and 2008. CCNC began as a small pilot program in 1998 and since 2001 has since expanded to a statewide program (Dobson & Levis Hewson, 2009). In 2007, the

program managed the care of approximately 80% of the state's Medicaid population and worked with over 50% of primary care practices in North Carolina (Steiner et al., 2008).

CCNC is implemented through 14 community networks that 1) link patients to a primary care medical home, 2) implement disease specific quality improvement initiatives, and 3) provide care management for high risk patients. The 14 non-profit networks receive a modest per member per month (PMPM) payment (ranging from $2.50 to $13.50) from the state to provide care management services as well as training, coordination, data feedback medical support staff, pharmacists, and psychiatrists (Steiner et al., 2008). Participating primary care providers also receive a PMPM payment for managing and coordinating care, but otherwise are reimbursed for services on a fee-for-service basis.

CCNC builds off the concepts of the chronic care model (Bodenheimer, Wagner, & Grumbach, 2002) and the pediatric medical home model (Sia, Tonniges, Osterhus, & Taba, 2004; American Academy of Pediatrics Ad Hoc Task Force on Definition of the Medical Home, 1992). These models emphasize accessible primary sites of care, quality improvement, care coordination, and care management. In fact, CCNC has developed a model of care that many people consider a “medical home” in the most general sense (Fields Leshen, & Patel, 2010; Takach, 2011; Bitton, Martin, & Landon, 2011), and which can be viewed as a potential model for medical home implementation. The logic model underlying CCNC is that the community resources of the networks combined with the three main elements will increase access to primary care, improve quality of care, reduced inpatient and ED use, and subsequently, lower total health care expenditures (Figure 1.1).

Evaluations of CCNC generally indicate increases in quality of care, increases in primary care utilization, decreases in inpatient and ED utilization, and decreases in expenditures. One early study compared the change in health care expenditures and utilization among Medicaid patients with asthma and diabetes in CCNC and Carolina Access, from 2000 to 2002 (Ricketts, Greene, Silberman, Howard, & Poley, 2004). Unlike CCNC, practices in the Carolina Access program do not participate in CCNC QI

initiatives or receive supports such as care management from the CCNC networks. CCNC asthma patients had lower per member per month expenditures, fewer yearly inpatient admissions, and fewer yearly ED visits compared to asthma patients in Carolina Access. Results were similar, though smaller in magnitude, for CCNC diabetes patients compared to diabetes patients in Carolina Access (Ricketts et al., 2004).

Domino et al. (2009) examined expenditures and utilization from 1998 to 2001 among children with asthma, comparing children in CCNC, Carolina Access, and regular fee-for-service Medicaid. Compared to fee-for-service Medicaid, both CCNC and Carolina Access patients had greater use of asthma maintenance medications and rescue medications; the effect for CCNC was greater than that for Carolina Access. Patients in CCNC also had greater outpatient service use, while having fewer inpatient admissions and ED visits, than patients in fee-for-service. Total spending was higher among CCNC patients compared to patients in fee-for-service, although spending for claims with an asthma diagnosis were not significantly different (Domino et al., 2009).

Multiple actuarial evaluations found lower projected total PMPM expenditures for patients in CCNC (Mercer Consulting Group, 2007; Treo Solutions, 2010; Milliman, 2011). Two of these evaluations specify that the cost savings were primarily due to decreases in inpatient hospitalizations and ED visits (Treo Solutions, 2010; Milliman, 2011). These studies also report increases in primary care and pharmacy expenditures, which indicate increased access to care. The increases in primary care and pharmacy expenditures, however, these increases were offset by decreases in inpatient and ED expenditures, resulting in a net decrease in expenditures. Additionally, a more recent evaluation examining patterns of utilization among CCNC patients found lower inpatient and ED utilization and higher primary care and pharmacy utilization among CCNC-enrolled patients compared to non-CCNC Medicaid patients (Treo Solutions, 2012).

It should be noted that the majority of these evaluations did not control for selection of Medicaid patients or providers into CCNC (Ricketts et al., 2004; Mercer Consulting Group, 2007; Treo Solutions, 2010; Milliman, 2011; Treo Solutions, 2012). Because CCNC patient enrollment is generally voluntary, it is possible that patients who join CCNC are systemically different from those that do not join. If these differences are also correlated with outcomes, results could be biased. While many of the evaluations did adjust for patient age, gender, and health status, the majority did not adequately control for potential selection, which limits the ability to interpret findings as causal. In addition, some evaluations do not include control groups, or adequate control groups, which again limits the ability to infer findings as causal.

However, taken as a whole these evaluations of CCNC, as well as CCNC tracked performance measures (e.g., between 2000 and 2004, performance on diabetes quality measures increased by 15%) (Dobson & Levis Hewson, 2009), suggest improvements in quality of care and primary care utilization, decreases in inpatient and ED use, and potential cost savings for certain populations over time. While these results indicate improved quality and outcomes in the target population, they may understate the additional benefits of CCNC. Notably, because CCNC is implemented for only Medicaid patients, it is possible that CCNC-induced changes in how providers care for patients in the CCNC Medicaid population also benefit other patients in the practice. As will be discussed further in Chapter 2, changes in how providers care for patients in one payer population have the potential to spill over into how they care for patients in other payer populations. For example, Medicare-managed care, wherein managed care-induced changes resulted in changes in provider care patterns for both managed care and non-managed care populations (Landon, Reschovsky, O'Malley, Pham, & Hadley, 2011; Chernew, Philip, & Town, 2008; Baker, 1999). Both managed care and CCNC work to change provider care patterns. Therefore, it is plausible that similar spillover effects will result from CCNC implementation. The success of CCNC in the

target population presents an excellent opportunity to evaluate the degree of practice-level spillover on a non-Medicaid population.

Study Overview

The purpose of this study is to quantify the spillover effects of CCNC by examining the extent to which North Carolina State Employee Health Plan (SHP) diabetes patients in CCNC practices experience greater improvements in quality of care, utilization, and medical expenditures than SHP diabetes patients in non-CCNC practices. Beginning in 2000, diabetes was the focus of one of the two initial CCNC disease management programs (the other being asthma) to improve both the process and outcomes of care. The duration and success of the initiative as well as the prevalence, morbidity, and costs of diabetes in both the Medicaid and SHP populations make diabetes an ideal area in which to investigate CCNC-induced spillover. In particular, I address the following three aims:

Aim 1: Evaluate the effect of practice participation in CCNC on the quality of care among North Carolina SHP diabetes patients.

Aim 2: Estimate the effect of practice participation in CCNC on health care utilization among SHP diabetes patients.

Aim 3: Quantify the effect of practice participation in CCNC on medical expenditures among SHP diabetes patients.

Chapter 2 presents the empirical literature regarding physician behavior and behavior change; previous evidence of physician behavior spillover; the conceptual model of spillover in CCNC; and the hypotheses stemming from this conceptual model. Chapter 3 describes the data and creation of the study sample for analysis. Chapter 4 details the measures used in analysis as well as the analytic methods. Chapter 5

presents the results from the main analytic models and sensitivity analysis. Chapter 6 discusses the clinical and policy implications of the study findings.

CHAPTER 2: LITERARTURE REVIEW, CONCEPTUAL MODEL, AND HYPOTHESES

Literature Review

CCNC-induced spillover is theorized to occur at the provider level, where changes in the care provided to CCNC Medicaid patients result in changes in the care provided to patients in all payer populations due to across the board changes in processes of care. There is evidence that physicians adopt a generalized style of delivering care across all patients (Eisenberg, 1979; Glied & Zivin, 2002; Frank & Zeckhauser, 2007), as a heuristic to lighten the cognitive load of medical decision-making (Tversky & Kahneman, 1974; Bornstein & Emler, 2001). Incentives to induce changes in care patterns for only one payer group complicate provider practice by introducing variation, especially if the changes are for a large proportion of patients. When incentives do produce changes for one payer population, adjusting care patterns for all other payer groups to match the change may thus simplify practice, both cognitively and organizationally.

Physician behavior and behavior change

It is generally accepted that individual physicians make consistent care decisions across patients' insurance coverage (i.e., they adopt generalized styles of care) (Eisenberg, 1979; Frank & Zeckhauser, 2007). For example, a physician will have a generalized way of caring for a patient with diabetes, regardless of the patient's type of insurance. This is not to say that a physician will not make care decisions incorporating information such as comorbidities, ability to pay for medications, etc., but instead that he/she starts from a similar care plan for each patient. This general belief is consistent with

the “norms” hypothesis, which contends that physicians adopt a generalized style of practice based on the overall incentives arrangements and do not vary care decisions based on a patient’s individual insurance coverage (Newhouse & Marquis, 1978).

A number of studies support the “norms” hypothesis. Hellerstein (1998) examines norm-following behavior in physician choice of prescribing generic versus brand-name drugs. After controlling for patient and provider characteristics, Hellerstein found that provider-level factors, both observed and unobserved, were the major source of variation in generic prescribing. Approximately 30% of the variance in generic prescribing was due to unobserved physician factors, and the author cites this as the evidence for norm-following behavior (Hellerstein, 1998). Noting the increasing degree of heterogeneity in insurance plans served by physician practices, Glied and Zivin (2002) examined the effect of insurance composition (i.e., level of fee-for-service and managed care coverage) within a practice on physician behavior. The authors found that while some customization of care does occur, the main driver of physician behavior is the insurance provider of the average patient. In other words, “Physicians who treat mostly HMO patients appear to adopt a practice style that offers equivalent treatment intensity along most measurable dimensions”(pg. 353). Frank and Zeckhauser (2007) examined the concentration of variation in visits and prescribing to determine if physicians use *custom-made* treatments (i.e., visit length and prescribing varies greatly among a physician’s patients) or *ready to wear* treatments (i.e., little variation in visit length and prescribing among patients). The authors found support for the use of ready to wear treatments, and thus norm-following behavior (Frank & Zeckhauser, 2007). Taken together these studies support the “norms” hypothesis that physicians adopt a generalized style of care common across all payer populations, though may adjust to fit the physicians patient panel.

The existence of norm-following behaviors results largely from the use of heuristics, or pattern-recognizing mental shortcuts (Kahneman, Slovic, & Tversky, 1982; McDonald, 1996; Marewski & Gigerenzer, 2012). Practicing medicine is complex: most physicians see a diverse array of patients with

varying levels of health status, work with a larger number of other health care professionals, and have a multitude of guidelines – for a multitude of health conditions – to incorporate into practice. In addition, physicians treat patients from a number of public and private health plans (35% of practices had more than 10 managed care contracts in 2001) (Cherry, Burt, & Woodwell, 2004). With all of these factors, customizing care based on a patient's insurance coverage is both cognitively and organizationally challenging as well as time consuming. Under circumstances of uncertainty and time constraints, heuristics allow faster decision-making while alleviating the cognitive and organizational burden (Marewski & Gigerenzer, 2012). For example, instead of looking to see the insurance coverage of a diabetes patient before deciding how to treat him/her, it is faster and easier to just treat all diabetes patients similarly no matter the insurance coverage. From this perspective, when an intervention targets physician behavior change for only one payer population (e.g., Medicaid patients), physicians have two general options to minimize the cognitive and organizational burden: 1) do not change behavior for any payer population, or 2) change behavior for all payer populations. In situations where an intervention does elicit physician behavior change in a subpopulation, adjusting care patterns for all other payer groups to match the change should simplify practice.

Spillover of Physician Behavior Change

Medicare managed care

Spillover occurred when Medicare managed care-induced changes resulted in changes for both managed care and non-managed care populations. Early studies examining the effect of Medicare managed care mainly focused on changes in health expenditures among fee-for-service Medicare beneficiaries. Baker (1999) found that increasing market-level health maintenance organization (HMO) penetration from 1990-1994 was associated with lower Part A and B expenditures among fee-for-service beneficiaries. These results were consistent with the others conducted during this time (Baker, 1997;

Baker & Sharkarkumar, 1998; Mathematica Policy Research, 1992; Bradfor & Krumholz, 2003). A more recent study by Chernew, DeCiccca, and Town (2008) also found that decreases in health expenditures among fee-for-service beneficiaries were largely driven by patients with chronic illness.

Studies examining utilization among fee-for-service Medicare beneficiaries also found evidence of the effect of market level HMO penetration. Baker, Afendulis, and Heidenreich (2004) compared market-area rates of percutaneous transluminal coronary angioplasty (PTCA) for patients with new acute myocardial infarction (AMI) by HMO market share; the authors found that between 1985-1999, compared to areas with low HMO market share, areas with high HMO market share had lower rates of PTCA. Similarly, other studies found: lower revascularization and cardiac catheterization rates for fee-for-service patients in areas with high HMO penetration (Bundorf et al., 2004); lower rates of coronary angiography with higher HMO market share (Meara, Landrum, Ayanian, McNeil, & Guadagnoli, 2004); and lower rates of angiography in high HMO areas (Heidenreich, McClellan, Frances, & Baker, 2001). Several studies have also examined cancer screening by HMO market share. Koroukian, Litaker, Dor, and Copper (2005) found that beneficiaries in areas with high HMO penetration were more likely to receive fecal occult blood testing (FOBT) or colonoscopy than flexible sigmoidoscopy (FLEX). A more recent study by Mobley et al. (2011) found that fee-for-service Medicare beneficiaries were more likely to get FLEX in areas with greater HMO penetration, but less likely to undergo colonoscopy. It should be noted that these results do not necessarily indicate that fee-for-service Medicare beneficiaries received better or worse quality of care, but that the care they received was similar to Medicare managed care beneficiaries indicating spillover of physician behavior.

All of the aforementioned studies investigated the effect of *market level HMO* penetration on outcome measures instead of *physician practice-level insurance* share. Nevertheless, statistically significant spillover effects were hypothesized to be in large part due to spillover of changed provider care patterns to fee-for-service patients. Broader area-level infrastructure and demand changes, such

as shifts in mix of services or patient demand for services, are also potential mechanisms through which spillover could occur. However, Landon, Reshovsky, O'Malley, Pham, and Hadley (2011) examined spillover at the practice level and found that physicians in highly capitated practices had lower spending per beneficiary than those in less capitated practices as well as lower intensity of care. These findings support the idea that changes in provider care patterns can apply to a larger patient population.

Other examples of spillover of physician behavior

Spillover of physician behavior change has also been noted with restricted drug formularies. In Illinois and Louisiana, Virabhak and Shinogle (2005) examined the effect of Medicaid preferred drug lists for cardiovascular medications on prescribing behavior in the non-Medicaid population. The authors found that in both states the prescribing of restricted cardiovascular pharmaceuticals decreased in both the Medicaid and non-Medicaid populations. In another study examining the spillover effects of restrictive formularies, Wang and Pauly (2005) found that the increased use of Protonix (a proton pump inhibitor) for non-Medicaid patients was also seen in Medicaid patients, even though Medicaid had an open formulary.

Valuck et al. (2007) examined the effect of the black box warning for use of selective serotonin reuptake inhibitors (SSRIs) among pediatric patients on use of SSRIs among adult patients with depression. They found that the diagnosis of depression among adults decreased after implementation of the black box warning for children. Furthermore adults with depression were less likely to receive an antidepressant (with differences greatest for SSRIs) after the black box warning, without comparable increases in other types of treatments.

Recently McWilliams, Landon, and Chernew (2013) investigated the potential spillover of an accountable care organization (ACO) implemented by one insurer in Massachusetts. In particular, the authors compared the change in spending and quality among Medicare patients before and after the

implementation of the Blue Cross Blue Shield of Massachusetts' Alternative Quality Contract. The results indicate lower spending among Medicare patients and improved quality for lipid screening; no other significant quality improvements were found (Williams et al., 2013).

The literature on provider practice "norms" and spillover of changes in provider behavior support the idea that for programs such as CCNC that are implemented for only a subpopulation of patients in a practice, intervention-induced changes in physician behavior could spill over to non-target populations. Therefore benefits from incentivized changes in the target population could also be observed in non-target populations.

Conceptual Model and Hypotheses

The conceptual model driving motivating CCNC is shown in Figure 2.1. CCNC utilizes three main strategies to efficiently improve the health and health care of Medicaid patients: 1) linking patients to a medical home (PCP Link), 2) implementing evidence-based quality improvement (QI) in practices, and 3) care managing high risk patients (CM) (see Figure 2.1). These three strategies affect the process of care within a practice, thereby influencing patient outcomes. Providers receive a PMPM payment to serve as a patient's medical home that provides 24/7 access to care and manages patients' utilization. In this way, CCNC seeks to increase access/use of primary care, as well as coordination and continuity of care. To improve quality of care, practices also adopt statewide quality guidelines and receive regular data feedback on practice performance. Audit and data feedback strategies are one of the more successful methods for physician behavior change (Grimshaw et al., 2001; Scott, 2009; Bloom, 2005). Care managers primarily work with high-risk patients to help them better manage their condition. Practices collaborate with these care managers to discuss how to improve patient care, a process similar to academic detailing (Bloom, 2005); the effect on quality of care is expected to be smaller than that of the QI initiatives due to lower frequency of interaction (as indicated by the thin line connecting "CM" to

"Quality" in Figure 2.1). All three strategies work together to improve quality, utilization, and expenditures, but the relative effectiveness of each component is unknown.

As described in Chapter 1, evaluations of CCNC have shown increases in quality and primary care utilization as well as reductions in inpatient use, ED use, and expenditures for patients under management (Ricketts et al., 2004; Mercer Consulting Group, 2007; Treo Solutions, 2010; Milliman, 2011; Treo Solutions, 2012). These results indicate changes in both the quality of care and outcomes for the target population – CCNC Medicaid patients. My central hypothesis is that the CCNC-induced changes in physician behavior have spilled over to non-Medicaid patients in CCNC practices through a process of adoption and learning (see Figure 2.2). In other words, as processes of care change for CCNC patients, so too do processes of care for non-CCNC patients. For example, increased access to care through longer office hours is available for all payer populations who receive care in CCNC practices. Furthermore, as providers learn to manage utilization for CCNC patients they will apply this utilization management to all patients. QI guidelines may be implemented for all payer populations to simplify practice, and data feedback will influence changes in processes of care for both CCNC Medicaid and non-CCNC Medicaid patients. Provider interactions with care managers will also influence care for all CCNC patients. Through changes in processes of care, the spillover of provider care patterns results in better quality of care (Aim 1), improved utilization (Aim 2), and lower medical expenditures (Aim 3) for SHP patients in CCNC practices. Therefore I hypothesize:

H1a: Practice participation in CCNC increases the probability that SHP diabetes patients receive recommended diabetes care.

H2a: Practice participation in CCNC decreases inpatient and ED utilization and increases patients' use of primary care and continuity of care among SHP diabetes patients.

H3a: *Practice participation in CCNC practices reduces medical expenditures for SHP diabetes patients.*

Additionally, changes in provider care patterns, and subsequently spillover, will depend on the proportion of CCNC patients in a practice (see Figure 2.3). A small proportion of CCNC patients may not be sufficient to trigger changes in provider care patterns; physicians report that the percentage of patients a plan covers influences the probability of using those plan developed processes (Bindman, Wholey, & Christianson, 2003). In other words, a threshold of patients is necessary to induce changes in practice; therefore, spillover will be moderated by CCNC patient load and I hypothesize:

H1b/2b/3b: The effect of practice participation in CCNC is moderated by the proportion of CCNC patients in the practice.

While I hypothesize spillover to occur for the process measures for which CCNC has successfully implemented program changes (i.e., for the diabetes quality measures), I do not expect to see CCNC-induced changes in process measures for which CCNC has not sought to change physician behavior. For the majority of the 2000's CCNC did not specifically seek to change physician behavior for preventive process measures, such as giving flu shot or breast cancer screening. Therefore, I do not expect so see an effect of CCNC on these "balancing measures" (Health Resources and Services Administration, 2011) and hypothesize:

H1c: Practice participation in CCNC does not change the probability that SHP patients receive recommended preventive care.

Nuances in Programmatic Effect

CCNC-induced improvements in quality, utilization, and expenditures may not occur immediately after a practice joins CCNC, as it can take time for improvements in care to trickle down to patient outcomes. Certain measures, such as use of primary care and quality process measures may increase soon after a practice joins CCNC (as indicated by the relative indentations of "Quality" and "Access" in Figures 2.1 and 2.2); extended office hours may be employed soon after practice enrollment and quality guidelines may also be implemented quickly. For these measures it is likely that I will see improvement during my study period. However, my study period may not be lengthy enough to capture increases in continuity of care or decreases in inpatient and ED utilization, as it may take more time for the CCNC-induced changes to demonstrate an effect. In this case, it is also possible that expenditures increase for SHP diabetes patients in CCNC practices in the period right after enrollment, as primary care expenditures increase initially, with increased access and care, while there is a delay before observing decreases in inpatient and ED utilization.

Additionally, an increase in receipt of recommended diabetes care without a corresponding decrease in inpatient and ED utilization may indicate the need for individual care management to reduce inpatient and ED use. CCNC care managers do work with providers to improve patient care, but when it comes to interaction with patients, they only work directly with CCNC patients who need help with chronic or high risk health conditions. Individual care management services, which SHP patients do not receive from CCNC, may be a necessary part of CCNC's success in reducing inpatient and ED utilization. These potential nuances in programmatic effect are important and will be taken into consideration when interpreting the study result.

CHAPTER 3: DATA AND SAMPLE

This study used a combination of patient- and practice-level data to create a hierarchical dataset of North Carolina State Employees Health Plan (SHP) diabetes patients nested within North Carolina primary care practices over time. This data set linked Community Care of North Carolina (CCNC) practice participation to patient-level health and demographic information for years 2002, 2005-2008.

Data Sources

Patients' quality of care, health care utilization, expenditures, and demographic measures were derived from SHP claims data for years 2002, 2005-2008. The SHP data included every health service reimbursed by the SHP including inpatient care, outpatient care, physician care, emergency department use, and prescription medications (Carolina Cost and Quality Initiative, n.d.). The data also included diagnoses, expenditures, and patient descriptors. The SHP claims also contained data on servicing provider, payment provider, provider type/specialty, and provider county for each outpatient physician claim and were linked to SHP administrative information on practice name, recorded date of practice enrollment in SHP, recorded date of disenrollment in SHP, and National Provider Identifier (NPI) number. The SHP data consisted of three separate files: 1) the member file, which included information on enrollment and disenrollment dates, Medicare start date, birth date, death date, etc.; 2) the combined claims file, which included all health care utilization claims; and 3) the pharmacy file, which included all pharmacy claims.

For practices that ever participated in CCNC (years 1998-2014), CCNC administrative data contained practice name, practice location address, CCNC network, date practice enrolled in CCNC, date practice disenrolled in CCNC, number of unique CCNC patients assigned to a practice in each year, practice type/specialty, and National Provider Identifier (NPI) number.

Sample

Patients

The sample for this study included SHP beneficiaries who were age 18 and older, diagnosed with diabetes, and had at least one visit to a primary care practice (in order to attribute to a primary care practice) during the study period. Using ICD-9 diagnosis codes (250.XX, 357.2X, 362.0X, 366.41, 648.0X), individuals were identified as having a diagnosis of diabetes if they met any of the following criteria: 1) at least one face-to-face acute inpatient or emergency department (ED) visit with a diagnosis of diabetes (acute inpatient visits were identified as those with an inpatient claim type or a claim with an inpatient hospital place of service code during the days of a hospital admission; ED visits were identified as visits with an ED indicator), 2) at least two face-to-face outpatient or nonacute inpatient visits on different dates of service with a diabetes diagnosis (outpatient CPT codes: 92002, 92004, 92012, 92014, 99201-99205, 99211-99215, 99217-99220, 99241-99245, 99341-99345, 99347-99350, 99384-99387, 99394-99397, 99401-99404, 99411, 99412, 99420, 99429, 99455, 99456; nonacute inpatient CPT codes: 99301-99313, 99315, 99316, 99318, 99321-99328, 99331-99337), or 3) at least one insulin or oral hypoglycemic/antihyperglycemic prescription event (HEDIS, 2008). This was based on the HEDIS criteria for identifying patients with diabetes (HEDIS, 2008); however, I expanded the IP and ED criteria in order to identify patients with diagnoses on either physician or facility claims. The HEDIS-recommended OP and non-acute IP CPT codes used were also somewhat restrictive, though I only excluded approximately 400 individuals by using these restrictive codes. In addition, women who gave birth during the study

period were excluded to eliminate the possibility of misdiagnosis of gestational diabetes; these women were identified using a combination of ICD-9 and CPT codes for births, either live or otherwise.

Patient-months were excluded if a patient was enrolled in Medicare (due to incomplete health services, pharmacy utilization, and cost data in SHP claims) or was retired (due to potential differences compared to the working age population, e.g., retired early due to illness). Observations before the first diagnosis of diabetes were excluded. Patient-years were excluded if a patient had less than 10 months in the SHP in that year (only months with full enrollment were included). Ten months was considered a reasonable length of time in which to accrue these outcomes at the person-year level (mean # months in SHP per year=9.5). Enrollment dates for SHP patients occurred at all times during the year, so the 10 month requirement did not inadvertently require two years of enrollment, which could have occurred if annual enrollment was at the same time every year (e.g., July 1). In fact, of the 18,461 individuals that never had a year with >=10 months in the SHP, 80% of these also never had >=10 months in the SHP overall during my study period. Individuals without a year with >=10 months in the SHP were generally older than the study sample and more were male, they had fewer outpatient, inpatient, and emergency department visits. Patient-years before the first visit to a primary care practice were also excluded as patients could not be attributed to a practice in years before the first visit. The initial patient sample for this study was 29,694 patients (Figure 3.1).

Technical Note on Recovering Missing Data

During the course of data cleaning I discovered that the enrollment dates in the member file were not always correct (i.e., some patients had claims dated earlier than the enrollment date) (Figure 3.2). Complete enrollment data was important because the enrollment file contained the Medicare start dates and SHP enrollment dates that I used to identify exclusion criteria (e.g., I required 10 months in

the SHP in each year for my sample and I could inadvertently exclude some person-years due to incorrect enrollment dates).

Following discussions with the Carolina Cost and Quality Initiative (CCQI), the holders of the SHP data, I was granted access to the raw member data. This raw data, as well as the combined claims and pharmacy data, contained two different individual identifiers: 1) *individualid* is unique to a patient, and 2) *newid* is not unique to a patient and typically changes after any breaks in SHP coverage. For example, if a patient was enrolled in the SHP from 2002-2004 and then from 2006-2008 he/she should have one *individualid* and two *newid* numbers. The raw data set was structured so that patients could have multiple rows of member information; the patient had a new row, and thus new enrollment/disenrollment date, each time they changed insurance product and/or enrolled in the SHP. Therefore, in order to get a complete view of a patient's time in the SHP, all rows for an *individualid* needed to be combined. However, a large number of rows in the raw file had missing *individualid*s with only *newid*s to identify them. Because the *individualid* is the only person identifier unique to a patient, it was necessary to recover the *individualid* in order to combine rows and get a complete view of a patients' time the SHP. To recover *individualid*s I first merged the rows that had missing *individualid*s with the combined claims using the *newid* in order to recover the *individualid* for the enrollment file (Figure 3.3). Through this process I was able to update 165,237 enrollment file rows with recovered *individualids*. All the recovered *individualid*s were duplicates of those already in the member file. In other words, by recovering the *individualid*s from the claims I was able to recover 165,237 previous SHP spans for the 992,782 patients in the original member file with *individualid*s.

Practices

Practice data were derived from a combination of SHP claims and administrative data as well as CCNC administrative data. The payment provider number from the SHP claims served as the basis for

identifying practices in the SHP claims because multiple servicing providers bill under one payment provider number. For each outpatient physician claim the servicing provider was the individual provider seen and the payment provider was the practice in which the patient was seen.

Identifying Primary Care Practices

To create an initial set of all primary care practices in which any SHP patient (either with or without diabetes) was seen during the study period, I first utilized SHP claims data to create a list of all payment provider identification numbers recorded in the claims during that time (N=52,510); the top specialties: 33% out of state, 19% multispecialty, 4.7% chiropractic, 4.5% family medicine, and 3% internal medicine). I then restricted the sample to practices (i.e., payment provider id numbers) with a primary care specialty. I defined primary care specialty as having a specialty code for family medicine, general medicine, internal medicine, pediatrics, public health, rural health clinic, or multispecialty with at least one primary care provider (i.e., a servicing provider with a specialty of family medicine, general medicine, internal medicine, pediatrics, physician assistant, or family nurse practitioner). I required at least one primary care provider for multispecialty practices in order to ensure at least some primary care focus. I linked this sample to the SHP administrative information on practice name, date of practice enrollment in SHP, date of disenrollment in SHP, and National Provider Identifier (NPI) number. Using this method I identified an initial sample of 5,851 primary care practices. Of these practices, 51% were family practice, 30% were internal medicine, 9% were multispecialty, 6% were pediatrics, 4% were general practice, and 2% were public health. Distributed among these practices (i.e., payment provider ids) were 18,872 primary care providers (i.e., servicing provider ids) (Figure 3.4).

Attribution of Patients to a Primary Care Practice

SHP patients are not administratively linked to a primary care practice as their appointed usual source of care. Therefore, in order to determine if a patient was in a CCNC or non-CCNC practice, I attributed a patient to a SHP primary care practice (i.e., payment provider number) in each year. Patients were attributed to a primary care practice based on a plurality of office or other outpatient Evaluation and Management codes (CPT codes: 99201-99205, 99211-99215, 99241-99245) to that practice during the measurement year. Visits were defined as a unique combination of patient, provider, and date of service. If a patient had the same number of visits to multiple practices, the patient was attributed to the practice that had the last visit during the year (Center for Medicare and Medicaid Services, n.d.; The Brookings Institution and Dartmouth Institute, 2011). Using this method, SHP diabetes patients were attributed to a total of 2,294 primary care practices out of the initial 5,851 primary care practices. While I attributed adult diabetes patients to under half of the total 5,851 primary care practices, further examination of the data indicated that many of the 5,851 practices were either out-of-state, pediatric practices, or in my study period for only one or two years.

Identifying CCNC Practices

I identified 2,294 primary care practices in which SHP diabetes patients were attributed. To determine which practices participated in CCNC, I first linked the SHP primary care practice sample with the CCNC administrative data using NPI. Of the 2,294 SHP primary care practices 948 practices matched to a CCNC record via NPI (Figure 3.5). Because the mandated use of NPI was only implemented in 2007 (CMS, 2007), practices that closed before 2008 did not have an NPI number (N=296). Additionally some practices changed NPI number over time, thereby having multiple NPIs, which resulted in the possibility of a non-match in NPI due to different NPIs listed in the SHP or CCNC data. Therefore, for SHP practices that did not match to a CCNC practice via NPI, I hand matched these practices to the remaining un-

matched CCNC practices using name, county, enrollment date, and disenrollment date. For example, I matched the SHP practice “Ahoskie Medical Associates” in Hertford County, which started in SHP in 1974 and ended in September 2010 to the CCNC practice “Ahoskie Medical Associates” in Hertford County, which disenrolled from CCNC in August 2010. Using this method I was able to match an additional 107 practices. To verify the hand matches I linked the SHP practices to the NPI database using the NPI in order to recover the business location address of practices in the NPI database. I then compared the recovered business location address with the location address listed in the CCNC administrative data. I verified a total of 44 practices. Of the remaining 63 practices, 46 closed prior to 2008 and did not have an NPI and so did not have an NPI business address to compare. Through the verification process also I matched an additional 14 practices that I had not previously hand matched, resulting in a total of 121 practices hand-matched.

There were some practices that had multiple identification numbers, either NPI or provider number, in the SHP or CCNC data; therefore the count of 2,294 practices was too large as it counted some practices more than once. To identify practices with multiple entries I used a combination of SHP practice name, enrollment and disenrollment dates, and identification number; multiple entries were considered one practice if they had the same name as well as consecutive disenrollment and enrollment dates (e.g., Carolina Family Prac & Sports Med had a disenrollment date of 05/31/2008 and Carolina Family Practice & Sports M had an enrollment date of 06/01/2008), or same name and it was that of a physician (Figure 3.6). Combining entries with consecutive disenrollment and enrollment dates and same physician name resulted in a practice sample of 2,140 practices. I updated patient attribution so that patients were attributed to one of these final 2,140 practices each year (Figure 3.7), of which 878 (42%) were ever in CCNC during my study period. In 2007 it was estimated that just over 50% of primary care practices in North Carolina were participating in CCNC (Steiner, 2009); because I am excluding many

pediatric practices, due to my study sample only including adults, 42% seems a plausible participation rate for my study sample.

Additionally, in some instances multiple CCNC practices shared the same NPI, which linked to the same SHP practice. For example, the CCNC practices "Park Ridge Medical Associates" and "Laurel Park Medical Center" were both linked to one SHP practice, "Park Ridge Medical Assoc" via NPI. This occurred for a total of 110 CCNC practices, grouped into 26 SHP practices, with the number of CCNC practices per SHP practice ranging from 2-13. I identified the practices at the SHP practice level (i.e., I identified 26 practices) but created indicators to identify that they were a part of a multi-site practice. Twenty-two of the 26 practices had sites with varying CCNC enrollment dates. I created indicators to identify these as mixed-CCNC practices.

Sample Exclusions

The final SHP sample excluded patient-years (~1%) in which a patient was attributed to one of the 54 practices located outside of North Carolina. I allowed individuals to be attributed to these practices, as individuals living near the NC boarder could reasonably seek the majority of their care in another state. However, I excluded these practices from analysis because health care laws and regulations, as well as provider practices can vary by state leading to potential systematic differences between North Carolina practices and those in other states. Additionally I excluded patient-years (~5%) in which a patient was attributed to one of the 22 practices that had multiple practice sites with varying CCNC enrollment dates as the effect of CCNC would be very imprecise and noisy for these practices.

I also excluded patient-years in which a patient was attributed to a practice that disenrolled from SHP before July 1 or joined SHP after July 1 of a year, as these practices were not able to provide a full year of services during these years. Lastly, I excluded patient-years (~1%) in which a patient was attributed to a practice that did not have a primary care physician. Some multispecialty practices

qualified for inclusion in the original practice sample because they had at least one primary care physician during the study period; however, practices did not necessarily have a primary care physician in each study year. As this study focuses on primary care practices, I did not include practice-years in which a practice had no primary care physicians because they would not be considered primary care practices in those years.

With these exclusions, the final patient sample was 28,293 nested within 2,038 practices, of which 858 were ever CCNC. The average number of patients per practice over the study period was 9.76, ranging from 1 to 345 patients.

County Data

Control data at the county level were obtained from several sources including the U.S. Census Bureau, the North Carolina Division of Medical Assistance (DMA), North Carolina Health Professions Data System (HPDS), and the USDA Economic Research Service. The U.S. Census Bureau holds the Small Area Income and Poverty Estimates, which includes the county population below the poverty line, and Intercensal Estimates of county racial/ethnic composition. The DMA holds data on the number of Medicaid patients in each county in North Carolina over the study period. The HPDS contains data on North Carolina county provider composition over the study period, including the number of total physicians and primary care physicians per county. The USDA Economic Research Service contains the 2003 Rural-Urban Continuum Codes used to identify rural/urban status

CHAPTER 4: MEASURES AND METHODS

This study estimated the spillover effects of Community Care of North Carolina (CCNC) by examining the extent to which North Carolina State Employee Health Plan (SHP) diabetes patients in CCNC practices experienced greater improvements in quality of care, utilization, and medical expenditures than SHP diabetes patients in non-CCNC practices. Aim 1 addressed quality of care by determining the effect of practice participation in CCNC on quality process measures (i.e., the receipt of recommended diabetes and preventive care). Aim 2 examined the effect of practice participation in CCNC on utilization, including inpatient, emergency department, and primary care utilization as well as continuity of care. Aim 3 quantified the effect on total medical expenditures as well as separately for inpatient, outpatient, and emergency department expenditures.

Measures

Dependent variables

The dependent variables for this study were patient-level measures of receipt of recommended diabetes care, receipt of recommended preventive care, health care utilization, and health care expenditures. All measures were derived from North Carolina State Employees Health Plan (SHP) claims data and collapsed to the person-year level for analysis.

Quality of Care

I examined annual receipt of four diabetes quality of care measures: hemoglobin A1c test, low-density lipoprotein (LDL) cholesterol test, eye exam, and attention for nephropathy (urine microalbumin test, diagnosis or treatment for nephropathy, visit to a nephrologist, or ACE/ARB prescription) (National Committee for Quality Assurance, 2009), each of which are: 1) important for the continued care of diabetes (American Diabetes Association), 2) can be identified using claims data, and 3) were part of the CCNC diabetes initiative at some point during my study period. I also defined three annual preventive quality measures (receipt of breast cancer screening, cervical cancer screening, and flu shot) as my balancing measures (Health Resources and Services Administration, 2011). None of the three measures were part of a CCNC initiative during my study period. These measures were derived from a combination of CPT and ICD-9 codes (Table 4.1) and were identified in either the inpatient or outpatient setting. Breast cancer screening and cervical cancer screening were defined only for women within the recommended age ranges at the time (age 40-74 and 21-64, respectively) (NCQA, 2008). All measures were defined as binary indicators for receipt of care during each year (1=Yes, 0=No).

Utilization

Health care utilization included number of inpatient admissions, number of emergency department (ED) visits, number of primary care visits, and continuity of care during the year. I defined all-cause acute inpatient admissions as those with an inpatient claim type or a claim with an inpatient hospital place of service code during the days of a hospital admission. I used all-cause admissions because it is difficult to validly identify diabetes-specific admissions. Admissions were a unique combination of patient and date of admission. Hospital transfers, identified from discharge status codes, were not counted as admissions. Only 10% of the person-year sample ever had an inpatient admission, and of those with an admission 76% had only one during the year. Therefore, instead of using a count of

inpatient admissions during the year, I defined inpatient admission as a binary indicator of hospital admission (1=Yes, 0=No).

I defined ED visits as the count of all-cause ED visits that did not result in an acute inpatient admission. Similar to inpatient admissions, I use all-cause visits due to potential incorrectness of diabetes as the primary diagnosis. I first identified all all-cause ED visits (identified as visits with an emergency room indicator), then excluded visits with an inpatient claim type. Similar to inpatient admissions, only 18% of individuals had an ED visit and of those with a visit the majority (74%) only had one visit. Therefore, instead of using a count of inpatient admissions during the year, I defined ED visits as a binary indicator of an ED visit (1=Yes, 0=No).

I summed the number of primary care visits to any primary care practice during the year. I first determined the number of outpatient physician visits during the year (CPT codes: 99201-99205, 99211-99215, 99241-99245); visits were a unique combination of patient, provider, and date of service. Visits were counted as primary care visits if they took place in one of the 5,851 SHP primary care practices, as defined previously in Chapter 3. I also calculated the number of total outpatient visits (primary care and specialty) during the year (CPT codes listed in Table 4.1). I examined both primary care and total outpatient physician visits to assess potential offsets of primary care use. For example, patients who decreased their use of primary care visits, but increased the use of specialty care, would have fewer primary care visits while total outpatient physician visits could remain the same.

I calculated continuity of care using a modified version of the Bice-Boxerman (Bice & Boxerman, 1977), using the number of practices seen instead of the number of providers seen:

$$COC = \frac{\sum_{j=1}^{S} n_j^2 - N}{N(N-1)} \quad \text{(Eq. 1)}$$

where *N* is the number of outpatient visits, *j* is the outpatient physician practice, and *n* is the number of visits to practice *j.* This measure is one of four commonly used claims-based continuity of care measures that are all highly correlated with one another (Pollack et al., 2013). The Bice-Boxerman measure calculates the concentration of a patients total outpatient visits during a specific time period that are to a single practice, with the index ranging from 0 (if each visit is to a different practice) to 1 (if each visit is to the same practice). I first calculated the total number of outpatient visits during the year (CPT codes listed in Table 4.1). Visits were a unique combination of patient, provider, and date of service. I then created a list of all outpatient practices seen during the study period; I excluded practices with a specialty of pharmacy, durable medical equipment, home infusion, independent laboratory, and ambulance as these were not considered to be outpatient clinic visits with a physician. Some practices had multiple entries (N=558 of 11,839); I considered multiple entries one practice if they had the same name as well as consecutive disenrollment and enrollment dates (e.g., Carolina Family Prac & Sports Med had a disenrollment date of 05/31/2008 and Carolina Family Practice & Sports M had an enrollment date of 06/01/2008), or same name of a physician. I then recalculated the continuity of care measure using this refined set of practices for patients with three or more visits in a year, the minimum number needed to assess continuity of care (Pollack et al., 2013). Additionally, it should be noted that because I am examining continuity of care in a chronically sick group, it may be necessary and beneficial for individuals to seek care from a specialist and primary care physicians. Therefore, while higher continuity of care is generally better, a value of one is not necessarily the ideal.

Expenditures

I examined expenditures from the SHP perspective, and therefore defined total yearly health care expenditures as the total amount paid by SHP during the year, including inpatient, outpatient, ED,

physician, and pharmacy expenditures. Expenditures were adjusted for medical inflation using the medical Consumer Price Index to adjust to 2008 dollars (Bureau of Labor Statistics, n.d.).

I also created separate measures for inpatient expenditures, ED expenditures, outpatient expenditures, and pharmacy expenditures in order to examine differential effects of CCNC participation on expenditures in different areas of care. As discussed in Chapter 2, it is possible that expenditures increase for outpatient care as primary care use increases, but that inpatient and ED expenditures do not decrease until later. Because it is difficult to identify the location of some services on the same date of service (e.g., laboratory codes could be either in the hospital or outpatient), I defined inpatient expenditures as all expenditures that occurred on the date of admission through the date of discharge. I defined ED expenditures as all expenditures that occurred on the date of the ED visit, for which there was not also an inpatient admission. Pharmacy expenditures were defined as all expenditures listed in the pharmacy claims. The remaining expenditures were defined as outpatient expenditures.

Key independent variables

The main independent variables of interest for this study were practice-level measures of yearly Community Care of North Carolina (CCNC) participation and the number of Medicaid-covered CCNC patients per CCNC practice. All measures were derived from CCNC administrative data and were collapsed to the practice-year level for analysis.

Practice participation in CCNC

Yearly practice participation in CCNC was defined as a binary indicator for a practice having an enrollment date in CCNC before July 1 of the year or the disenrollment date after July 1 (1=Yes, 0=No). This measure equates to a requirement of being enrolled in CCNC for at least six months out of the year, as almost no practices qualified as having six months without also fitting into the July 1 requirement

(e.g., they did not enroll in March and disenroll in September of the same year). As noted in Chapter 2, CCNC-induced improvements in quality, utilization, and expenditures may not occur immediately after a practice joins CCNC, as it can take time for improvements in care to trickle down to patient outcomes. Therefore I used a six month requirement in CCNC before considering a practice a CCNC practice. Forty-five practices had CCNC disenrollment dates before July 1 and 131 had enrollment dates after July 1. Because multiple entries existed for some CCNC practices, due to multiple NPI or Medicaid provider numbers, I used the earliest enrollment date and latest disenrollment date for these practices.

CCNC patients

While I hypothesized in Chapter 2 that practice participation in CCNC is moderated by the proportion of CCNC Medicaid patients in a practice, I was not able to calculate that total number of patients in a practice due to data limitations; without a denominator I could not calculate the proportion. Therefore this variable was defined as the count of unique Medicaid CCNC patients assigned to a practice during the year. Not all of the patients necessarily visited the practice, nor did they all have diabetes; however, the number assigned serves as a proxy for CCNC caseload for a practice. Because the relationship between Medicaid CCNC patients and outcomes was hypothesized to be non-linear (e.g., potentially exhibiting a threshold effect and/or a ceiling effect) and could vary with the outcome, I categorized the count of patients into five categories based on the percentile distribution of CCNC patients per practice: very low (<100), low (100-349), medium (350-699), high (700-999), and very high (>=1000). Categorization of this variable allowed for a flexible and variable relationship between CCNC Medicaid patients and outcomes. In addition, I compared the category specification to a continuous variable with quadratic specification, and found that the categories were a better fit for the data. This variable was only defined for CCNC practices.

Control variables

Patient-level

Patients age at the beginning of the year and gender were obtained from the SHP claims data. These measures capture predisposing factors of service use (Andersen and Aday, 1974). To capture need for health services (Andersen and Aday, 1974), I used an adapted version of the Charlson comorbidity index (Charlson & Sax, 1987; Deyo, Cherkin, & Ciol, 1992), using the coding algorithms refined by Quan et al. (2005). The Charlson index is a commonly used measure of comorbidity in health services research. Other measures of comorbidity do exist, such as the Chronis Illness and Disability Payment System (CDPS); however the CDPS was created for the Medicaid population (Kronick, Litaker, Dor, & Cooper, 2000), which potentially has a very different health profile than the SHP population. Therefore, for my sample of privately insured adults, I felt the Charlson index was an appropriate measure.

While the index typically uses inpatient diagnoses to identify comorbidities, I used diagnoses from inpatient, ED, and outpatient visits in order to get a more complete view of patient comorbidities, especially for those patients without an inpatient visit during the year. I excluded the diabetes categories from the algorithm, since the entire sample had diabetes. I defined the index as the Charlson weighted sum, which is a weighted count of comorbidities.

I also controlled for how a patient qualified for SHP (subscriber, spouse, or other), as illness severity may vary by group (e.g., sick spouses may be more likely to be covered than well spouses). The exact mechanism and/or difference captured by this variable is uncertain – it may be just as possible that a spouse chooses to be covered because they have no other insurance options instead of disease severity reasons – but it is included in order to capture any underlying differences. I also controlled for SHP plan (comprehensive major medical, Smart Choice, Smart Choice Basic, Smart Choice Plus), which captures cost-sharing levels.

Practice-level

I controlled for practice type, practice size, and multisite practice, as these factors were found in previous work to influence some individual outcomes among CCNC diabetes patients (King, n.d.). Practice type was defined as institutional/specialty or community-based practices (King, n.d). Institutional/specialty practices were those with a specialty of rural health clinic, public health clinic, or multispecialty. The remaining practices were considered community-based practices.

Practice size was defined as the number of primary care providers in a practice in each year. Primary care providers had a specialty of internal medicine, family medicine, general medicine, pediatrics, physician assistant, or family nurse practitioner. To calculate the number of providers I first created a dataset of all providers that billed under a primary care provider payment number in each year. I combined providers for practices that I had previously determined to have multiple entries (see Chapter 3). I then excluded multiple provider entries and calculated the sum of providers per practice in each year.

Multisite practice was defined as a binary indicator of whether a SHP practice included multiple CCNC practice sites. I defined multisite with mixed CCNC enrollment as a binary indicator of whether a practice was a multisite practice for which the practice sites had different dates of CCNC enrollment. Both measures were determined during the SHP and CCNC matching process.

County-level

County level control variables included proportion of the population below the poverty line, proportion of the population non-Hispanic white, proportion of the population non-Hispanic black, proportion of the population Hispanic (the three racial/ethnic variables were mutually exclusive), and number of primary care providers per 10,000 population. I defined rural/urban status using the Rural-

Urban Continuum Codes (United States Department of Agriculture Economic Research Service, 2003; USDAERS, 2004). I categorized the variable into three categories: urban, defined as codes 1-3; non-rural, non-urban, defined as codes 4-7; and rural, defined as codes 8-9.

Methods

This study utilized longitudinal analyses to examine changes in patient-level outcomes over time (years 2002, 2005-2008). I examined diabetes patients in a subsample of practices that exhibited common likelihood of ever joining CCNC. I first conducted bivariate analyses comparing values of diabetes and preventive quality measures, health care utilization, and expenditures, as well as control variables for patients in CCNC and non-CCNC practices. I then used multi-level models to estimate the effect of practice participation in CCNC on patient outcomes.

Addressing Selection Bias

In 2002, CCNC began to expand from the initial pilot networks, which encompassed 10 of North Carolina's 100 counties, to a statewide program of 14 community networks. This expansion included both growth of the existing networks to neighboring counties and creation of new networks. As the networks expanded, they recruited primary care practices to voluntarily join CCNC. Some practices may have been more likely to join CCNC than others, for example, practices that had lower quality of care and were seeking support for quality improvement. Comparing changes in patient outcomes due to joining CCNC without controlling for the initial quality of the two groups, or other baseline differences, would lead to biased estimates. Additionally, practices that joined earlier may have been more "quality oriented" than practices that joined later. The potential endogeneity due to this underlying, unobserved quality orientation could bias estimates. I theorize that the potential selection exists at the practice level, not the patient level, because practices voluntarily selected to become a CCNC practice while SHP

patients did not know if the practice they chose was, or was not, a CCNC practice. Because I used non-CCNC practices as controls, it was necessary to ensure that non-CCNC practices were sufficiently similar to CCNC practices in order to produce unbiased estimates of the effect of CCNC on patient outcomes. I used two main strategies to mitigate this bias, as described below.

Practice sample exhibiting common support

For my analyses I included only practices that had similar probabilities of ever being enrolled in CCNC (i.e., exhibited common support), to create a more homogenous study sample. To create a practice sample that exhibited common support, I first used a method similar to calculating propensity scores: logistic regression to model the likelihood of a practice ever becoming a CCNC practice during the study period based on observed baseline practice and county characteristics.

$$\Pr(\textit{CCNC EVER}=1|X) = \exp(X\beta)/(1+\exp(X\beta)) \quad \text{(Eq. 2)}$$

$$\text{with } X\beta = \beta_0 + \beta_1 V + \beta_2 W + \varepsilon$$

where *CCNC EVER* is an indicator for whether a practice joined CCNC during my study period, *V* are practice characteristics, and *W* are county characteristics. Practice characteristics included size (count of primary care providers) and a binary indicator of practice type (1=community-based, 0=institutional/specialty). The quadratic form of practice size was used to increase model fit (Wald statistic=57.47, $p<0.001$). County characteristics included proportion of the population below the poverty line, racial/ethnic composition (i.e., proportion non-Hispanic white, proportion non-Hispanic black and proportion Hispanic), proportion of population on Medicaid, rural/urban status (i.e., urban, non-metropolitan urban, or rural), and number of primary care providers per 10,000 population. Many of these factors were previously found to influence individual outcomes among CCNC diabetes patients

(King, n.d.), or were hypothesized to influence patient outcomes. The vast majority of practices (N=1,734) existed in the SHP in 2002, and for these practices I used 2002 values for variables. For the practices that joined from 2005-2008, I used variables from the first year available (e.g., if a practice joined in 2005, I used 2005 values). Therefore, I included a control variable for the study year in which a practice was first in SHP. A Pregibon's linktest indicated that interactions or additional higher ordered terms would not improve the fit of the model (hat p-value<0.001, hatsq pvalue=0.655).

I only included practices for which the distribution of predicted probabilities for joining CCNC exhibited common support (Freburger, Carey, & Holmes, 2006). This strategy essentially excludes outliers or practices that are very dissimilar to other practices. To create the trimmed sample I first compared the propensity score distributions for the CCNC and non-CCNC groups; common support was defined as the overlapping distribution (0.0562036–0.9161462). I excluded 9 CCNC practices and 3 non-CCNC practices whose score fell outside of the overlapping distribution, or range of common support. Years in which a patient was attributed to one of these 12 practices were excluded from analyses (N*t=4,351; N=1,386).

I also examined covariate balance, using standardized differences, before and after trimming (Table 4.2). Because significant imbalance remained after trimming (indicated by a standardized difference >0.10), I included all variables from the propensity score-like model in the main outcome model. Because of the imbalance after trimming, I also examined propensity-score weighted models, using inverse probability of treatment weights (IPTWs). Weighting did achieve covariate balance, and results were very similar to results from the unweighted models. Therefore, I continued to use my original strategy using the unweighted models.

Controlling for additional selection bias

While creating a practice sample with common support excludes very dissimilar practices, there was still the potential for remaining selection bias. To address observed selection bias I controlled for differences between practices in my main analyses using observed practice-level and county characteristics (as described above). To address time-invariant unobserved selection I included an indicator in the main analyses for whether a practice was ever enrolled in CCNC during the study period, which controlled for baseline differences between the two groups. For example, if practices that joined CCNC had higher or lower initial quality than practices that did not join, the indicator would control for the baseline differences in quality. I defined ever CCNC as a binary indicator of whether a practice ever enrolled in CCNC (1=Yes, 0=No). Additionally, I included an indicator for whether a practice enrolled in CCNC within the year after a CCNC network expanded to a county, which controlled for differences between early and late adopters. Early adopter was defined as whether a practice joined CCNC within the first year that a CCNC network expanded to a practice's county. I identified the date of expansion into a county as the CCNC enrollment date of the practice that first enrolled in the county. Practices were considered early adopters if they enrolled in CCNC within one year of the first enrollment date in the county. During the expansion of CCNC it was possible for a few practices to join the program before a county joined, making the early adopter indicator potentially endogenous. However, because I have time varying indicators for CCNC participation, the CCNC indicators should control for this potential endogeneity.

Use of multi-level models

Due to the hierarchical structure of my data (patients clustered within practices), within-cluster correlation is likely to exist; this could violate the assumption of independence of errors and could result in incorrect standard errors on my parameter estimates. To account for the clustering of patients within

practices I used multi-level estimation, which allows for and models the correlation of errors between patients within a practice (Rabe-Hesketh & Skrondal, 2012). I used random intercept models with the practice-level random intercepts representing unobserved random differences between practices.

In addition to correcting for the correlation of errors among patients in practices, multi-level models have several other beneficial properties. First they allow for inclusion of explanatory variables from multiple levels, such as both the patient and practice level. Second they allow for examination of between-cluster (i.e., between-practice) variance unaccounted for by explanatory variables in the model. Understanding this between practice heterogeneity can be an outcome of interest itself. The ability to compare between-cluster heterogeneity is an advantage of multi-level models over generalized estimating equations (GEE). Furthermore, multi-level models provide inferences for practices with very small numbers of patients through the use of partial pooling (i.e., shrinkage) (Rabe-Hesketh & Skrondal, 2012).

Despite these advantages, it should be noted that unbiased estimation of multi-level random intercept models requires the error term and variables in the model to be uncorrelated, and this requirement pertains to all levels of the model (e.g., patient and provider-level). For example, if there are unobserved practice characteristics that are correlated both with participation in CCNC and outcome measures, results will be biased. I conducted sensitivity analyses using fixed-effects estimation, which does not require this type of independence, and compared model estimates to those of the multi-level models (described below).

Statistical Analyses

I used random intercept multi-level models to estimate the effect of CCNC practice participation on patient outcomes. To test hypotheses H1a and H1c for Aim 1 (Quality) I estimated the following multi-level logit models:

$$\Pr(\text{ReceiptRec}_{ipct}=1 \mid X_{ipcn}) = \exp(X\beta)/(1+\exp(X\beta)) \quad \text{(Eq. 3)}$$

$$\text{with } X\beta = \beta_0 + \beta_1 Enrolled_{pct} + \beta_2 Ever_{pc} + \beta_3 EarlyAdopt_{pc} + \beta_4 V_{ipct} + \beta_5 W_{pct} + \beta_6 Z_{ct} + \beta_7 T_t + \mu_p + \varepsilon_{ipct}$$

where *i* indicates the individual, *p* indicates the practice, *c* indicates the county, and *t* indicates the year. *ReceiptRec*, is a binary indicator for whether an individual received recommended care (either diabetes care or preventive care) during the measurement year, and *Enrolled* is a binary indicator for time specific practice participation in CCNC. *Ever* is a binary indicator for whether a practice ever participated in CCNC, which controls for baseline differences between the groups. *EarlyAdopt* is a binary indicator for whether a practice enrolled in CCNC in the year after a CCNC Network expanded to a county. *V* is a vector of individual characteristics, *W* is a vector of practice characteristics, *Z* is a vector of county characteristics, and *T* are time fixed effects. μ_p is the practice specific random error component and ε_{ipct} is the patient error. Both μ_p and ε_{ipct} are assumed to be normally distributed with mean zero. β_1 is the coefficient of interest and will give the effect of practice participation on the receipt of recommended care.

To test hypothesis H1b I limited the sample to practices that were enrolled in CCNC in each time period, and estimated the following multi-level logit model:

$$\Pr(\text{ReceiptRec}_{ipct}=1 \mid X_{ipcn}) = \exp(X\beta)/(1+\exp(X\beta)) \quad \text{(Eq. 4)}$$

$$\text{with } X\beta = \beta_0 + \beta_1 \#CCNC_{pct} + \beta_2 V_{ipct} + \beta_3 W_{pct} + \beta_4 Z_{ct} + \beta_5 T_t + \mu_p + \varepsilon_{ipct}$$

where *i* indicates the individual, *p* indicates the practice, *c* indicates the county, and *t* indicates the year. *#CCNC* is the number of CCNC Medicaid patients in a practice. *V* is a vector of individual characteristics, *W* is a vector of practice characteristics, *Z* is a vector of county characteristics, and *T* are time fixed

effects. μ_p is the practice specific random error component and ε_{ipct} is the patient error. Both μ_p and ε_{ipct} are assumed to be normally distributed with mean zero. B_1 is the coefficients of interest. Because I categorized the number of CCNC patients, I also conducted Wald tests for the joint significance of the number of CCNC patient categories.

I used the same general analytic strategy as described for hypothesis H1a to test hypotheses H2a for Aim 2 (Utilization) and H3a for Aim 3 (Expenditures). To test hypothesis H2a I used a multi-level logit models to determine the effect of CCNC practice participation on inpatient use and ED use, a multi-level Poisson model with reintroduced zeros (as inclusion criteria required at least one primary care visit and multi-level zero-truncated models are currently unavailable) to examine the effect on primary care visits and total outpatient physician visits, and a multi-level ordinary least squares (OLS) model with robust standard errors to estimate the effect on continuity of care. To test hypothesis H3a I first used a multi-level Poisson model with gamma variance to estimate the effect of practice participation in CCNC on total expenditures. Compared to a log-transformed model, the Poisson model can incorporate zero values, does not need smearing to recover estimates, and estimates are robust to misspecification of the variance function (Deb, Manning, Norton, 2006). However, estimation using this method was unsuccessful (i.e., models did not converge). I attempted multiple solutions, including rescaling the dependent variable, excluding outliers, not using adaptive quadrature, running a basic Poisson model and then using the matrix values as initial values for the multi-level model. Maximum likelihood estimates could still not be computed after these attempts (i.e., models did not converge). Therefore, I used multi-level OLS with bootstrapped standard errors to estimate the effect of CCNC on expenditures. Because I am examining expenditures from the SHP prospective (i.e., their paid amount), and their main focus for cost savings is typically on mean expenditures, this estimation strategy provides easily interpretable and useful estimates.

I used the same analytic strategy as described for hypothesis H1b to test hypotheses H2b and H3b. For hypothesis H2b I used multi-level logit models to determine the moderating effect on inpatient use and ED use, a multi-level Poisson model with reintroduced zeros to examine the moderating effect on primary care visits and total outpatient physician visits, and a multi-level OLS with robust standard errors to estimate the moderating effect on continuity of care. For hypothesis H3a I used a multi-level OLS model with bootstrapped standard errors to estimate the effect of practice participation in CCNC on total expenditures.

All models were estimated in Stata 12. All binary outcome models were estimated using meqrlogit, the Stata command for multi-level mixed effects logit models, and all OLS models were estimated using xtmixed, and all count models were estimated using meqrpossion. All models were initially run using the Laplacian approximation, which is equivalent to using adaptive quadrature with one integration point (Rabe-Hesketh & Skrondal, 2012). More accurate approximations of the outcome are achieved with more integration points, however computation time also increases along with accuracy. Therefore, I chose one model from each of the three Aims and estimated the models with five quadrature points, using the matrixes from the initial models as starting values. I then estimated the models with eight quadrature points, using the matrixes from the previous models as starting values. The coefficient estimates and standard errors changed very little with increasing numbers of integration points; for example, for the A1c outcome the coefficients and standard errors for the CCNC indicator were 0.162 (0.058) for the Laplacian model, 0.161 (.058) for the model with five quadrature points, and 0.162 (.058) for the model with eight quadrature points. Therefore, all results presented are from the original models using the Laplacian approximation.

In the analyses I used the quadratic form of both age and comorbidities to allow for nonlinear relationships with the outcomes. For example, a patient may be more likely to receive an A1c test with increasing comorbidities due to increasing attention to medical conditions, but the association may

decrease after a certain number of comorbidities because attention cannot be adequately paid to all health issues during a physician visit. I conducted Wald tests to test the quadratic functional forms of age and comorbidities. Both tests rejected the null that the quadratic components (e.g., age and age^2) were simultaneously equal to zero (p-values<0.001). The used the Wald test because it approximates the Likelihood Ratio test, but only requires estimating the unrestricted model; because my models took a long time to run, the Wald test was more time efficient.

I calculated the median odds ratio (MOR) for each model in order to quantify the between-cluster (i.e., between-practice) heterogeneity for each outcome. The MOR compares two random individuals with the same covariate values but who are in two different clusters, comparing the person with the higher propensity to the person with the lower propensity (Rabe-Hesketh & Skrondal, 2012). It is calculated using the cluster-level variance as follows:

$$Median\ Odds\ Ratio = \exp\left(\sqrt{2 * \sigma_p^2}\right) * \left(\Phi^{-1}(0.75)\right) \quad \text{(Eq. 5)}$$

where σ_p^2 is the cluster variance, and ϕ is the cumulative distribution function of the normal distribution. The value of the MOR is always greater than or equal to one, with a value of one indicating no between-cluster variation, and increasing values indicating increasing variation (Rabe-Hesketh & Skrondal, 2012).

Fixed-Effects Estimation

As mentioned above, unbiased estimation of multi-level models requires the error term and variables in the model to be uncorrelated, and this requirement pertains to all levels of the model (e.g., patient and provider level). To address concerns that this requirement was not met and that selection

bias was still present due to unobserved practice characteristics, I conducted fixed-effects estimation to control for all omitted time-invariant practice characteristics.

All binary outcome models were estimated using linear probability models (LPMs) with practice-level fixed effects (Wooldridge, 2005). I used LPMs instead of Chamberlain conditional logit models to ease interpretability of results. LPMs can result in out of range predictions (average of approximately 3% out of range predictions in my models) but they still produce the correct marginal effects that were the main interest of the models. I corrected for the inherent heteroskedasticity in LPMs by using cluster-robust standard errors. Similarly, all count models were estimated using ordinary least squares (OLS) with practice-level fixed effects and cluster-robust standard errors.

I then compared the average marginal effects of CCNC from the fixed effects models to those from the multi-level models. In the fixed effects models, the estimated coefficients represent the marginal effects, while that is not the case for the multi-level logit and Poisson models. Therefore, I calculated the population-averaged average marginal effects from the multi-level models using recycled predictions. For example, I calculated the population-averaged average marginal effect of CCNC on receipt of A1c by predicting the average probability of receipt of A1c if everyone in the sample had CCNC=1 and then predicting the probability as if everyone had CCNC=0, incorporating the practice specific intercepts, and then taking the difference between the two predicted probabilities. I then bootstrapped the estimate to calculate the standard error of the estimate. I used a parametric bootstrap procedure using the estimated parameters and the estimated standard errors of the predicted values in logit space, converted to probabilities from the estimated models and assuming the independence of errors. I used a parametric bootstrap instead of the nonparametric due to time considerations. Each model took approximately 5-10 minutes to run; using a non-parametric bootstrap procedure with 1000 replications would thus take an estimated 5000 minutes per model, of which I had 31 main models, and thus approximately 107 days.

Sensitivity analyses

Stratification by practice size: Because it is possible for the effects of practice-level interventions to vary by practice size (Piatt et al., 2006), heterogeneity in the effect of CCNC by practice size could be possible. Therefore, I conducted sensitivity analyses wherein I stratified analyses by practice size (as measured by the number of primary care physicians). I examined the distribution of practice size and created three stratification levels based on the distribution of providers per practice and sample size of each strata (i.e., percentiles): 1) small/solo practices (1 primary care provider), 2) medium practices (2-3 primary care providers), and 3) large practices (>=3 primary care providers).

Stratification by baseline quality: Practices with high initial quality may not exhibit much change over time, as their quality was already high. When examining changes in patient quality in a practice over time, it is important to control for is the initial quality of care in the practice. I had originally planned to use baseline (i.e., 2002) practice-level quality as a time-invariant variable in the models. However, only about half of the primary care practices had diabetes patients from my sample attributed to them in 2002, and so I could not use the variable for the main analyses. Additionally baseline quality could be endogenous in that it is influenced by factors not controlled for in my model; therefore including this variable in my model could bias estimates. Therefore, I conducted sensitivity analyses stratifying analyses by initial quality of care. For each binary outcome, the initial practice quality was the proportion of diabetes patients in the practice that received the test during the year. For count patient outcomes and expenditures, the initial practice quality was the average value for diabetes patients in the practice during the year. I only included practices with at least three patients to avoid all or none baseline values (e.g., 0 or 1), which are more likely with a small number of patients. I created three

strata for each outcome based on the percentile distribution of the values – low, medium, and high - based on the distribution of the baseline values for that outcome and sample size considerations.

Stratification by primary care use: For the quality of care models, patients with greater primary care use could have more opportunities for care than patients with lower primary care use, in that patients with more visits have greater opportunities to receive a test (e.g., A1c). However, I did not include this variable in my models due to the potential endogeneity of primary care visits; because outcomes and primary care visits are measured in the same year, there could be reverse causality in that getting a test would result in more primary care visits. Therefore, I stratified quality of care models by patient primary care use based on the percentile distribution. I categorized this variable as low use (<3 visits), medium use (3-5 visits), and high use (>=6 visits). Additionally, because the continuity of care measure depends on the total number of visits during the year, I also stratified the continuity of are analyses by patient primary care use.

CHAPTER 5: RESULTS

The final study sample included 26,907 SHP diabetes patients in 2,026 North Carolina primary care practices (Table 5.1). Patients had an average age of 49, the majority were female, and they had an average Charlson index score of 1.37. Most patients were the main plan subscriber and the majority had the Smartchoice SHP plan (61%), followed by Smartchoice Basic. Over the study period, just over half of patient-years were attributed to a primary care practice that ever participated in CCNC; the majority of these were attributed to a practice in years after the practice joined CCNC. In unadjusted comparisons patients attributed to CCNC practices were relatively similar to those attributed to non-CCNC practices, though they were slightly younger, more were the main plan subscriber, and more were in the Smartchoice Basic SHP plan.

Nearly half of primary care practices were ever in CCNC (Table 5.2). However, of the practices that were ever in CCNC only about one-fifth of practice-years in my sample were prior to joining CCNC. This amount of pre-CCNC data was less than expected, and was most likely the result of lack of data in 2002 for many practices. The vast majority of primary care practices were community-based, single-site, and urban. The average number of primary care providers (PCPs) was 3, though many of the practices had only 1 PCP. On average, practices were in counties with 9 PCPs per 10,000 population, with poverty rates of 15 percent, and with the majority of people in counties being white, non-Hispanic. Compared to practices not in CCNC, CCNC practices had more PCPs and more were in non-urban/non-rural (i.e., suburban) or rural counties. CCNC practices were also in counties with fewer PCPs per 10,000 population, higher poverty rates, and greater proportions of non-white residents. Across the study

period, unadjusted yearly rates for receipt of diabetes quality measures were relatively high (76% for A1c testing, 70% for LDL testing, 37% for eye exam, and 81% for attention for nephropathy). Receipt of eye exam was low, but this is consistent with other studies (Lee, Feldman, Ostermann, Brown, & Sloan, 2003). Yearly unadjusted rates for preventive measures were also somewhat low and averaged 34% for flu shot, 31% for breast cancer screening (among women age 40-74), and 22% for cervical cancer screening (among women age 21-64). Average yearly OP use was high (8 total outpatient visits (OP) and 5 primary care visits), while IP and ED use was relatively low (0.14 inpatient (IP) admissions, and 0.26 ED visits). Average continuity of care was 0.47. Total yearly SHP paid expenditures were approximately $8,500.

In unadjusted comparisons, patients in CCNC practices had lower rates of yearly A1c testing, yearly LDL testing, and cervical cancer screening, and higher rates of flu shots and breast cancer screening, compared to patients in non-CCNC practices. Patients in CCNC practices also had fewer total OP visits, though no difference in PCP visits, potentially indicating lower use of specialty care. In addition, patients in CCNC practices had more ED visits, higher continuity of care (mostly likely due to fewer OP visits), and higher total SHP paid expenditures.

Main Results

Quality of Care

H1a: Practice participation in CCNC increases the probability that SHP diabetes patients receive recommended diabetes care.

The effect of a practice, which was ever in CCNC, joining CCNC was only significant for yearly A1c testing, though the effects were positive for all diabetes quality measures (Table 5.4a). For patients in practices that were ever in CCNC, the practice joining CCNC resulted in a 18% increase in the odds of a patient receiving an A1c test (CI: 1.05,1.32), which equates to a population-averaged average marginal

effect of a 2.1 percentage point increase in the probability of receiving an A1c test (CI: 0.0064,0.0346). The effect on receiving an LDL test was a 4% increase in the odds of receiving the test (CI: 0.94,1.14), which equates to a 0.6 percentage point increase in the probability of receiving the LDL test (CI: -0.010,0.022); the effect on receiving an eye exam was a 3% increase in the odds (CI: 0.95,1.12), or a 0.7 percentage point increase in the probability of receiving an eye exam (CI: -0.011,0.025).; the effect on receiving attention for nephropathy was a 6% increase in the odds (CI: 0.96,1.17), or a 0.8 percentage point increase in the probability of receiving attention of nephropathy (CI: -0.0065,0.0217). While the effects were relatively small, they were in the hypothesized direction.

The other key covariate was whether a practice was ever in CCNC, which was included to control for selection of practices into CCNC. Patients in practices that were ever in CCNC during the study period had significantly lower odds of receiving an A1c test and LDL test (OR=0.74, CI:0.61,0.90; OR=0.76, CI:0.64-0.90, respectively), compared to patients in practices that were never in CCNC; the effect on eye exam and attention for nephropathy were also negative, but not statistically significant. These results indicate a selection of lower quality practices into CCNC. Patients in CCNC practices that were early adopters of CCNC also had lower odds of receiving an A1c test, LDL test, or attention for nephropathy, though the effects were again insignificant.

Age was associated with a significant increase in the odds of receiving an A1c test, LDL test, and attention for nephropathy, though it was negatively associated with the odds of receiving an eye exam. Male gender was also associated with increased odds of receiving an A1c or LDL test, and decreased odds of receiving and eye exam. Greater comorbidity, as measured by the Charlson index, was associated with significantly greater odds of receiving all diabetes quality measures, though the association was diminishing. Compared to SHP subscribers, spouses had significantly lower odds of receiving both A1c and LDL tests, and compared to patients in CMM plans, patients in all other plans had greater odds of receiving all the diabetes quality measures. Patients in practices in non-urban/non-rural

and rural counties had significantly lower odds of receiving A1c or LDL tests compared to patients in practices in urban counties, and patients in practices in non-urban/non-rural counties had lower odds of receiving attention for nephropathy, and patients in practices in rural counties had lower odds of receiving an eye exam. Patients in practices in counties with higher poverty rates had lower odds of receiving an LDL test or attention for nephropathy, and patients in practices in counties with more PCPs/10,000 population had lower odds of receiving all diabetes measures except eye exams, which was significantly positive. Both the proportion of non-white, non-Hispanic and Hispanic population in a county was negatively associated with the receipt of an eye exam, but positively associated with receiving attention for nephropathy. Most performance measures increased over time; the exception was receipt of A1c, which had negative and generally insignificant association with the receipt of test.

The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were very similar to those from the fixed effects models (Table 5.4b). For the A1c models, the effects were almost identical (MLM AME=0.021, FE AME=0.020), though the fixed-effect estimate did not reach statistical significance (p=0.091). The estimates varied more for the other models, though the estimates from the multi-level models fell within the confidence intervals of the fixed effect estimates and are likely clinically insignificant.

H1b: The effect of practice participation in CCNC is moderated by the proportion of CCNC patients in the practice.

Among CCNC practices, CCNC patient load did not have a significant effect on diabetes quality measures (Table 5.5a). In addition, the joint tests of significance from all models for the CCNC patient categories were statistically insignificant (A1c: χ^2=8.70, p=0.0690; LDL: χ^2=8.33, p=0.0803; Eye Exam: χ^2=4.51, p=0.3412; Attention for Nephropathy: χ^2=5.13, p=0.2739).

Overall, the results for these models for the other covariates were similar to the results presented in Table 5.4a. Patients in CCNC practices that were early adopters of CCNC had significantly lower odds of receiving an LDL test (OR=0.99, CI: 0.99,1.00), again indicating some selection of practices with lower quality. Age was associated with an increase in the odds of receiving an A1c test, LDL test, and attention for nephropathy, and was negatively associated with the odds of receiving an eye exam. Male gender was also associated with increased odds of receiving an A1c or LDL test, and decreased odds of receiving an eye exam. Greater comorbidity, as measured by the Charlson index, was associated with significantly greater odds of receiving all diabetes quality measures, though the association was diminishing as Charlson increased. Compared to SHP subscribers, spouses had significantly lower odds of receiving both A1c and LDL tests, and compared to patients in CMM plans, patients in SmartChoice plans had greater odds of receiving an LDL test, eye exam, and attention for nephropathy; patients in SmartChoice Basic plans had greater odds of receiving an LDL test; patients in SmartChoice Plus plans had greater odds of receiving an eye exam. Patients in practices in non-urban/non-rural and rural counties had significantly lower odds of receiving an eye exam or attention for nephropathy, and patients in practices in rural counties had lower odds of receiving an eye exam. Patients in practices in counties with higher poverty rates had lower odds of receiving an LDL test, and patients in practices in counties with more PCPs/10,000 population had lower odds of receiving all diabetes measures except eye exams, which was significantly positive. The proportion of non-white, non-Hispanic individuals in a county was negatively associated with the receipt of an eye exam, but positively associated with receiving attention for nephropathy. Generally, values for all diabetes measures increased over time; the exception was receipt of A1c, which was unchanged (statistically) over the study period.

The population-averaged average marginal effects for the main variables of interest, the categories for number of CCNC patients, from the multi-level models were again similar to those from the fixed effects models (Table 5.5b). The estimates from the multi-level models again fell within the

confidence intervals of the fixed effect estimates, although the intervals for these models were generally wider.

H1c: Practice participation in CCNC does not change the probability that SHP patients receive recommended preventive care.

Table 5.6a considers whether CCNC practices had different performance on preventive measures. The effect of a practice, which was ever in CCNC, joining CCNC was positive but insignificant for receipt of yearly flu shot and breast cancer screening, but there was a significantly inverse relationship for receipt of cervical cancer screening. For patients in practices that were ever in CCNC, the practice joining CCNC resulted in a 14% decrease in the odds of a patient receiving cervical cancer screening (CI: 0.75,0.99), which equates to a population-averaged average marginal effect of a 2.3 percentage point decrease in the probability of receiving cervical cancer screening test (CI: -0.0447,-0.0019).

Patients in practices that were ever in CCNC during the study period had significantly lower odds of breast cancer screening (OR=0.81, CI:0.65-0.99), and patients in CCNC practices that were early adopters of CCNC also had lower odds of receiving both breast cancer screening and cervical cancer screening. Age was associated with a significant decrease in the odds of receiving a flu shot and increased odds of breast cancer screening. Male gender was also associated with decreased odds of receiving a flu shot. Greater comorbidity, as measured by the Charlson index, was associated with significantly greater odds of receiving a flu shot, though the effect was diminishing, and significantly lower odds of cervical cancer screening. Compared to SHP subscribers, spouses had significantly lower odds of receiving all preventive measures, and compared to patients in CMM plans, patients in SmartChoice plans had greater odds of receiving all measures. Patients in practices with more primary care providers had greater odds of receiving breast cancer screening but lower odds or receiving cervical

cancer screening. Patients in multisite practices had significantly greater odds of cervical cancer screening. Patients in practices in non-urban/non-rural and rural counties had significantly lower odds of receiving all measures, and patients in practices in counties with higher poverty rates had greater odds of receiving breast cancer screening and lower odds of receiving cervical cancer screening. Patients in practices in counties with more PCPs/10,000 population had greater odds of receiving a flu shot but lower odds or receiving cervical cancer screening. Both the proportion of non-white, non-Hispanic and Hispanic population in a county was negatively associated with the receipt of a flu shot and breast cancer screening, but positively associated with receiving cervical cancer screening. Year effects were generally positively associated with odds of receiving all measures; the exception was receipt of flu shot in 2005 and 2006, compared to 2002.

The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were very similar to those from the fixed effects models (Table 5.6b). For the cervical cancer screening model, the effects were almost identical (MLM AME=-0.0233, FE AME=-0.0239) and both were significant. The estimates varied more for the other models, though the estimates from the multi-level models fell within the confidence intervals of the fixed effect estimates.

Summary of quality of care results

The results indicate a small but positive spillover for receipt of A1c test among SHP diabetes patients in CCNC practices; although the effect of a practice joining CCNC is also positive for the other diabetes quality measures, it is not significant. Additionally, there is not a significant moderating effect of the number of CCNC patients on receipt of diabetes quality measures. In regard to preventive measures, a practice joining CCNC did not significantly affect the receipt of yearly flu shot or breast cancer screening, which is again consistent with the study hypotheses; however, it did significantly lower the probability of receiving cervical cancer screening.

Health Care Utilization

H2a: Practice participation in CCNC decreases inpatient and emergency department utilization and increases patients' use of primary care and continuity of care among SHP diabetes patients.

The effect of a practice joining CCNC was negative for all utilization measures, though was only significant for number of PCP visits and number of total OP visits during the year (Table 5.7a). For patients in practices that were ever in CCNC, the practice joining CCNC resulted in a 5% decrease in PCP visits (CI: 0.93,0.97), which equates to a population-averaged average marginal effect of 0.29 fewer visits (CI: -0.36,-0.21), and a 4% decrease in total OP visits (CI:0.94,0.97), which equates to 0.29 fewer visits (CI: -0.40,-0.19).

Patients in practices that were ever in CCNC and those that were in practices that were early adopters of CCNC had higher odds of an ED visit during the year as well as greater continuity of care. Age was associated with lower odds of an IP admission or ED visit, fewer total OP visits, and higher continuity of care (the effect for continuity was diminishing). Male gender was also associated with decreased odds of an IP admission or ED visit, as well as fewer PCP and OP visits; male gender was associated with higher continuity of care. Greater comorbidity, as measured by the Charlson index, was associated with significantly greater odds of an IP admission and ED visit, though the effect was diminishing, more PCP and total OP visits, and lower continuity of care. Compared to SHP subscribers, spouses had significantly greater odds of an IP admission as well as more PCP and total OP visits and lower continuity of care. Compared to patients in CMM plans, patients in SmartChoice plans had greater had lower odds of and IP admission or ED visit, more total OP visits, and lower continuity of care; patients in SmartChoice Basic also had lower odds of an IP admission and ED visit, had fewer PCP and OP visits, and higher continuity of care; patients in SmartChoice Plus had greater odds of an IP admission, more PCP and OP visits, and lower continuity of care. Patients in practices with more primary care

providers had significantly more PCP and total OP visits. Compared to patients in urban counties, patients in practices in non-urban/non-rural counties had greater odds of an ED visit and fewer total OP visits, and patients in rural counties had significantly greater continuity of care. Patients in community-based practices had lower odds of an IP admission, fewer PCP and total OP visits, and greater continuity of care. Patients in practices in counties with higher poverty rates had more PCP visits. The proportion of non-white, non-Hispanic population in a county was associated with increased odds of an ED visit, and the proportion of Hispanic population in a county was positively associated with continuity of care. Year effects were significantly positive for any ED visit and OP visits, but were negatively associated with PCP visits and continuity of care.

The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were very similar to those from the fixed effects models (Table 5.7b). In addition, all the estimates from the multi-level models fell within the confidence intervals of the fixed effect estimates.

H2b: The effect of practice participation in CCNC is moderated by the proportion of CCNC patients in the practice.

Among CCNC practices, the moderating effect of CCNC patient load was significant primarily for total OP visits and continuity of care, though there were also significant effects for very high patient load on IP admission and ED visit (Table 5.8a). Compared to patients in practices with a very low number of CCNC patients, SHP patients in practices with a very high number of CCNC patients had 19% lower odds of an IP admission (CI:0.68,0.96), which equates to a 1.6 percentage point decrease in the probability (CI: -0.0293,-0.0027), and 21% increased odds of an ED visit (CI:1.03,1.42), which equates to a 2.8 percentage point increase in the probability (CI: 0.0025,0.0535). Compared to patients in practices with a very low number of CCNC patients, patients in all other categories had significantly fewer OP visits

equating to 0.34 fewer in practices with a low number of CCNC patients (CI: -0.58,-0.10), 0.50 fewer in practices with a medium number of CCNC patients (CI: -0.74,-0.26), 0.49 fewer in practices with a high number of CCNC patients (CI: -0.83,-0.15), and 0.64 fewer in practices with a very high number of CCNC patients (CI: -0.96,-0.32). Conversely, compared to patients in practices with a very low number of CCNC patients, patients in all other categories had significantly greater continuity of care equating to 0.036 higher in practices in practices with a low number of CCNC patients (CI: 0.017,0.055), 0.044 higher in practices with a medium number of CCNC patients (CI: 0.026,0.062), 0.054 higher in practices with a high number of CCNC patients (CI: 0.029,0.079), and 0.051 higher in practices with a very high number of CCNC patients (CI: 0.039,0.083). In addition, the joint tests of significance for the ED visit, OP visits, and continuity of care models were all significant (ED: χ^2=9.89, p=0.0422; OP: χ^2=17.10, p=0.0018; COC: χ^2=27.80, p<0.001).

Patients in practices that were early adopters of CCNC had significantly greater odds of an ED visit, compared to patients in practices that were not early adopters. Age was associated with lower odds of an ED visit, fewer total OP visits, and higher continuity of care (the effect for continuity was diminishing). Male gender was also associated with decreased odds of an ED visit, as well as fewer PCP and OP visits; male gender was associated with higher continuity of care. Greater comorbidity, as measured by the Charlson index, was associated with significantly greater odds of an IP admission and ED visit, though the effect was diminishing, more PCP and total OP visits, and lower continuity of care. Compared to SHP subscribers, spouses had significantly greater odds of an IP admission as well as more PCP and total OP visits and lower continuity of care. Compared to patients in CMM plans, patients in SmartChoice plans had lower odds of and IP admission or ED visit and fewer PCP visits; patients in SmartChoice Basic also had lower odds of an IP admission and ED visit, had fewer PCP and OP visits, and higher continuity of care; patients in SmartChoice Plus had greater odds of an IP admission as well as more PCP and OP visits. Compared to patients in urban counties, patients in practices in both non-

urban/non-rural and rural counties had fewer total OP visits and greater continuity of care. Patients in practices in counties with higher poverty rates had more PCP visits. The proportion of non-white, non-Hispanic population in a county was associated with increased odds of an ED visit, and the proportion of Hispanic population in a county was positively associated with fewer OP visits. Year effects were significantly negative PCP visits and continuity of care, but were positively associated with OP visits.

The population-averaged average marginal effects for the main variables of interest, the categories for number of CCNC patients, from the multi-level models were somewhat different from those from the fixed effects models (Table 5.8b), though the estimates from the multi-level models again fell within the confidence intervals of the fixed effect estimates. In particular, the significant effects for very high patient load on IP admission and ED visit, as well as the significant effects of all categories on OP visits lost significance and were the opposite sign in the fixed effects models. In addition, the significant effects on continuity of care also lost significance in the fixed effects models.

Summary of utilization results

In summary, this study does not indicate a spillover on IP or ED use, or continuity of care, though the signs on the estimates for IP admission and ED visits are in the hypothesized direction. However, there is a significant effect of a practice joining CCNC on both PCP visits and total OP visits, though the effects are small and opposite to the hypothesized direction – CCNC participation seems to decrease PCP and total OP visits. There are two potential explanations for these results: 1) increasing PCP access and utilization for CCNC patients resulted in reduced use among other patients in the practice to accommodate increased CCNC patient use, or 2) because there are no significant changes in IP admission, ED visit, or continuity of care, the reduced use may indicate better management of utilization. Also, because there were decreases in both PCP and total OP visits, it does not appear that patients were offsetting decreased PCP use with increased specialty use.

In regard to the moderating effect of CCNC patient load, while the multi-level model estimates indicate a moderating effect for total OP use and continuity of care, the fixed effects estimates indicate no moderating effects for any outcome.

Paid Medical Expenditures

H3a: Practice participation in CCNC practices reduces medical expenditures for SHP diabetes patients.

The effect of a practice, which was ever in CCNC, joining CCNC for medical expenditure was not statistically significant (Table 5.9a). Additionally, the effect sizes were all relatively small, with the largest effect being for OP expenditures; patients in a practice, which was ever in CCNC, and then joined CCNC had a $224 increase in annual OP expenditures.

Patients in practices that were ever in CCNC had significantly lower OP expenditures and those that were in practices that were early adopters of CCNC had higher ED expenditures lower Rx expenditures. Age was associated with lower IP expenditures and higher Rx expenditures. Male gender was also associated with higher IP cost and Rx expenditures, and lower ED and OP expenditures. Greater comorbidity, as measured by the Charlson index, was associated with significantly higher expenditures for all cost categories. Compared to SHP subscribers, spouses had significantly higher expenditures in all cost categories. Compared to patients in CMM plans, patients in SmartChoice plans had lower total, IP, and ED expenditures; patients in SmartChoice Basic had lower total, IP, OP, and Rx expenditures; patients in SmartChoice Plus had higher total, ED, OP, and Rx expenditures. Patients in practices with more primary care providers had significantly greater ED and Rx expenditures, though the effect sizes were small. Compared to patients in urban counties, patients in practices in non-urban/non-rural counties had higher ED expenditures. Community-based practices had lower IP and OP expenditures. The county proportion in poverty was negatively associated with both ED and OP expenditures. The proportion of non-white, non-Hispanic population in a county was associated with higher ED

expenditures and lower Rx expenditures. Year effects were significantly positive for all cost categories except IP expenditures.

The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were very similar to those from the fixed effects models (Table 5.9b). Similar to the multi-level models estimates, the fixed effects estimates were not significant. In addition, all the estimates from the multi-level models fell within the confidence intervals of the fixed effect estimates.

H3b: The effect of practice participation in CCNC is moderated by the proportion of CCNC patients in the practice.

There were significant moderating effects of CCNC patient load on total expenditures, OP expenditures, and pharmacy (Rx) expenditures (Table 5.10a). Compared to patients in CCNC practices with a very low number of CCNC patients, SHP patients in practices with a low number, medium number, and very high number of CCNC patients all had significantly lower expenditures (-$1038.01, CI:-1962.91,-113.12; -$1265.29, CI:-2223.35,-307.22); and -$1856.86, CI:-2825.48,-888.24, respectively). In addition, patients in all categories of CCNC patient load had lower expenditures than patients in practices with a very low number of CCNC patients; patients in practices with a medium number and very high number of CCNC patients also had lower Rx expenditures. The joint tests of significance for the total expenditures, OP expenditures, and Rx expenditures models were all significant (total: χ^2=16.14, p=0.0028; OP: χ^2=22.75, p=<0.001; Rx: χ^2=20.42, p<0.001).

Patients in practices that were early adopters of CCNC had significantly higher ED expenditures and lower Rx expenditures. Age was associated with higher Rx expenditures. Male gender was also associated with higher IP expenditures and lower ED and OP expenditures. Greater comorbidity, as measured by the Charlson index, was associated with significantly higher expenditures for all cost categories. Compared to SHP subscribers, spouses had significantly higher expenditures in all cost

categories. Compared to patients in CMM plans, patients in SmartChoice plans had lower total, IP, and ED expenditures; patients in SmartChoice Basic had lower total, IP, and Rx expenditures; patients in SmartChoice Plus had higher total, ED, OP, and Rx expenditures. Patients in practices with more primary care providers had significantly greater total, IP, OP, and Rx expenditures. The county proportion in poverty was negatively associated with ED expenditures. The proportion of non-white, non-Hispanic population in a county was associated with higher ED expenditures and lower Rx expenditures. Year effects were significantly positive for ED and Rx expenditures.

The population-averaged average marginal effects for the main variables of interest, the categories for number of CCNC patients, from the multi-level models varied quite a bit from those from the fixed effects models (Table 5.10b), and the multilevel estimates did not always fall within the confidence intervals of the fixed effects estimates. In particular, the directions of the effects for almost all estimates were opposite in the fixed effects models compared to the multi-level models. In the fixed effects model, compared to patients in CCNC practices with a very low number of CCNC patients, SHP patients in practices with a very high number of CCNC patients had significantly higher total expenditures ($3180.85, CI:244.01,6117.69) as opposed to the multi-level model which indicated significantly lower total expenditures. Also in the fixed effects model, compared to patients in CCNC practices with a very low number of CCNC patients, SHP patients in practices with a very high number of CCNC patients had significantly higher IP expenditures ($2167.17, CI:211.09,4113.25) as opposed to the multi-level model which indicated insignificantly lower expenditures. In addition, the significant moderating effects for OP and Rx expenditures in the multi-level models lost significance, and changed sign in the fixed effects models.

Summary of medical expenditure results

This study does not indicate a CCNC practice participation spillover among any of the cost categories. In regard to the moderating effect of CCNC patient load, while the multi-level model estimates indicate a moderating effect for total expenditures, OP expenditures, and Rx expenditures, the fixed effects estimates indicate moderating effects only for total expenditures and IP expenditures that are opposite in direction from the multi-level estimates. In addition, the total cost estimates appear to be driven by different factors in the multi-level and fixed effects models. In the multi-level models, the negative moderating effect on total expenditures appears to be driven by lower OP expenditures among CCNC patient categories with more patients. In the fixed-effects models, the positive moderating effect on total expenditures appears to be driven by higher IP expenditures among CCNC patient categories with more CCNC patients.

Sensitivity Analyses

Stratification by practice size

Quality of care: The effect of a practice, which was ever in CCNC, joining CCNC was positive but decreased in magnitude with practice size for both receipt of A1c test and LDL test (Table 5.11a); the effect for both models was largest in practices with only one PCP (i.e., small practices). For patients in in small practices that were ever in CCNC, the practice joining CCNC was associated with a 56% increase in the odds of a patient receiving an A1c test (CI: 1.11,2.20), which equates to a population-averaged average marginal effect of a 6.2 percentage point increase in the probability of receiving an A1c test (CI: 0.017,0.106). The effect on receiving an LDL test was a 21% increase in the odds of receiving the test (CI: 0.88,1.66), which equates to a 3 percentage point increase in the probability of receiving the LDL test (CI: -0.019,0.079), though the effect was not significant. For the eye exam and attention for nephropathy models, the effect of a practice joining CCNC was largest among medium sized practices and was

negative for small practices, though again the effect was not significant. The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were very similar to those from the fixed effects models for all practice sizes (Table 5.11b). For the A1c models, the effects among small practices were very close (MLM AME=0.62, FE AME=0.075), and both were statistically significant. The estimates varied more for the other models, though the estimates from the multi-level models fell within the confidence intervals of the fixed effect estimates.

The main analyses did not indicate a significant moderating effect of CCNC patient load. However, some moderating effects were present in the stratified analyses (Table 5.12a). For the A1C models patients in large practices with high and very high patient loads, compared to large practices with very low patient load, had significantly lower odds of receiving the test. Additionally, for the attention for nephropathy model, patients in large practices with low, high, and very high patient loads, compared to small practices with very low patient load, had significantly lower odds of receiving attention for nephropathy. For the eye exam model, patients in small practices with high and very high patient loads, compared to small practices with very low patient load, had lower odds of receiving an eye exam. The population-averaged average marginal effects from the multi-level models were very similar to those from the fixed effects models (Table 5.12b).

Health care utilization: The effect of a practice, which was ever in CCNC, joining CCNC was not significant for >=1 IP admission or >=1 ED visit at any practice size (Table 5.13a), though the effects were most negative for small practices. For the PCP and total OP visits models, the effect of a practice joining CCNC was only significant for small and large practices; for patients in small practices, which were ever in CCNC, the practice joining CCNC resulted in an 8% decrease in PCP visits (CI:0.86,0.99) (or 0.63 fewer PCP visits (CI: -0.90,-0.36)) and a 7% decrease in PCP visits in large practices (CI: 0.90,0.95) (or 0.28 fewer visits (CI: -0.38,-0.17)). A practice joining CCNC was positively associated with continuity of care in small

and medium practices, though the effects were not significant, but significantly negatively associated with continuity of care in large practices. The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were similar to those from the fixed effects models (Table 5.13b), with all the estimates from the multi-level models falling within the confidence intervals of the fixed effect estimates. However, the significant negative effect of a small practice joining CCNC on PCP and total OP visits failed to reach significance in the fixed effects models.

The main analyses did not indicate a significant moderating effect of CCNC patient load. However, some moderating effects were present in the stratified analyses (Table 5.14a). Patients in small practices with low and very high CCNC patient load, compared to practices with very low patient load, had significantly lower odds of >=1 IP admissions. In addition, patients in medium sized practices with higher CCNC patient load had significantly fewer total OP visits and higher continuity of care. The population-averaged average marginal effects from the multi-level models were generally similar to those from the fixed effects models (Table 5.14b). However, the negative effects of patient load category in medium practices on total OP visits changed sign, and were not significant in the fixed effects models; loss of significance also occurred for COC in medium practices. Additionally, in the fixed effects model, patients in small practices with medium, high, and very high CCNC patient loads, compared to practices with very low CCNC patient load, had significantly lower probability of an ED visit.

Paid health care expenditures: The effect of a practice, which was ever in CCNC, joining CCNC on total expenditures was positive and greatest among small practices (Table 5.15a), though none of the effects were significant. The effect of a practice joining CCNC on IP expenditures was only negative for large practices, and the effect of a practice joining CCNC on ED expenditures was only negative for small practices. Increases in OP expenditures due to a practice joining CCNC was largest among small practices, though again all effects were insignificant. The effect on Rx expenditures was also insignificant

and negative for both small and medium practices. The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were again very similar to those from the fixed effects models (Table 5.15b).

For practices in CCNC, there was some evidence of moderating effects of CCNC patient load in the stratified analyses (Table 5.16a). For patients in small practices with low and medium CCNC, patient load had significantly lower total health care expenditures and IP expenditures. In addition, for patients in large practices with medium and high CCNC patient load, compared to patients in large practices with very low CCNC patient load, had significantly higher IP expenditures. For total OP visits, patients in small and medium sized practices with higher CCNC patient loads had significantly lower total OP costs. The population-averaged average marginal effects from the multi-level models differed somewhat from those from the fixed effects models (Table 5.16b). In particular, only the positive effects of higher patient load on IP expenditures in large practices were significant in the fixed-effects models.

Stratification by Baseline Quality

Quality of care: The effect of a practice, which was ever in CCNC, joining CCNC was generally the most positive, but not significant, in practices with medium and high baseline quality (Table 5.17a). Patients in practices that joined CCNC that had high or medium baseline values for quality measures generally had greater increases in the probability of receiving a test; for practices with low baseline quality for LDL test and eye exam, joining CCNC was negatively associated with a patient receiving the respective tests, though the effects were not significant. The one exception was for attention for nephropathy, for which the effect was most positive for practices with low baseline quality. The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were similar to those from the fixed effects models for all categories of baseline quality (Table 5.17b), and fell within the confidence intervals of the fixed effects estimates.

For practices in CCNC, stratification by baseline quality did not indicate moderating effects of CCNC patient load (Table 5.18a). In addition, the population-averaged average marginal effects from the multi-level models were generally similar to those from the fixed effects models (Table 5.18b).

Health care utilization: For IP admission and ED visits, the effect of a practice, which was ever in CCNC, joining CCNC was generally the most positive, but not significant, in practices with medium and high baseline rates of IP admissions and ED visits (Table 5.19a). For example, for patients in practices with high rates of IP admission, the practice joining CCNC led to 7% greater odds of >=1 IP admission (or a 0.5 percentage point increase in the probability (CI: -0.012,0.023)). For the PCP visit models, decreases in PCP visits were largest in practices with low or medium baseline average practice visits; for total OP visit models, decreases in visits were largest in practices with high baseline average practice visits. Increases in continuity of care were concentrated in practices with medium baseline continuity of care values. The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were similar to those from the fixed effects models (Table 5.19b), with all the estimates from the multi-level models falling within the confidence intervals of the fixed effect estimates. However, the negative effect for the PCP and total OP models did not reach significance in the fixed effects models.

Stratification by baseline values did indicate some moderating effects of CCNC patient load for practices with high baseline values, especially for the PCP visits, total OP visits, and COC models (Table 5.20a). However the average marginal effects from the fixed effects models (Table 5.20b) indicated significant effects for only total OP visits and COC. For total OP visits, patients in practices with high baseline total OP visits with high or very high CCNC patient load had significantly fewer total OP visits. For COC, patients in practices with medium baseline COC with low and medium CCNC patient load had significantly higher COC.

Paid health care expenditures: The effect of a practice, which was ever in CCNC, joining CCNC on total expenditures was only positive in practices with medium baseline expenditures (Table 5.21a), though none of the effects were significant. Decreases in IP expenditures were largest in practices with low baseline IP expenditures, increases in ED expenditures were largest in practices with medium baseline ED expenditures, increases in OP expenditures were largest in practices with low baseline OP expenditures, and decreases in Rx expenditures were largest in practices with medium baseline Rx expenditures. None of the effects, regardless of baseline expenditures, were significant. The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were again very similar to those from the fixed effects models (Table 5.21b).

Stratification by baseline values did indicate some moderating effects of CCNC patient in the multi-level models (Table 5.22a); however the average marginal effects from the fixed effects models (Table 5.22b) indicated that the effects were not significant. In addition, the fixed effects model indicated that patients in practices with high baseline total expenditures with high and very high CCNC patient loads had significantly greater total expenditures.

Stratification by Primary Care Use

Quality of care: The effect of a practice, which was ever in CCNC, joining CCNC was generally the most positive, for patients with medium PCP use (Table 5.23a). For the A1c models, patients with medium PCP use in practices that joined CCNC had a significant 25% increase in the odds of an A1c test (CI:1.03,1.51), or 2.4 percentage point increase in the probability (CI: 0.0040,0.0442). The one exception was for receipt of eye exam, which was the most positive for patients with low PCP use. The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models

were again very similar to those from the fixed effects models (Table 5.23b), though the estimate for receipt of A1C for patients with medium PCP use did not reach significance in the fixed effects model.

Stratification by primary care use did indicate some moderating effects of CCNC patient in the multi-level models (Table 5.24a), though the effects were primarily seen in the fixed effects models (Table 5.24b). In particular, for patients with high PCP use in practices with medium and high CCNC patient load, compared to patients in practices with very low CCNC patient load, had significantly lower probability of receiving an A1c test or attention for nephropathy. In addition, patients with low PCP use in practices with greater CCNC patient loads had significantly lower probabilities of receiving an eye exam.

Health care utilization: The effect of a practice, which was ever in CCNC, joining CCNC on continuity of care was positive for patients with medium PCP use and negative for patients with high PCP use, though neither effect was significant (Table 5.25a). The population-averaged average marginal effects for the main variable of interest, CCNC, from the multi-level models were again very similar to those from the fixed effects models (Table 5.25b), though both effects were negative in the fixed effects models. In addition, neither the multi-level (Table 5.26a) nor the fixed effects (Table 5.26b) models indicated a moderating effect of CCNC patient load for the stratified analyses.

Practice Heterogeneity – Median Odds Ratio

I calculated the median odds ratio (MOR) for each main model in order to quantify the between-cluster (i.e., between-practice) heterogeneity for each outcome (Table 5.27). The greatest amount of heterogeneity occurred in the A1c and LDL models, which exhibited the highest MOR values. For example, if two otherwise identical patients were drawn from two random practices, the median odds ratio of the difference between the two would be 8.28. Because testing for A1c and LDL may be more

under the direct control of a provider, and thus can vary more by provider/practice-level than the other outcome measures in this study, it is consistent that practice-level heterogeneity is larger for these outcomes.

CHAPTER 6: DISCUSSION AND POLICY IMPLICATIONS

Discussion

With the high and rising prevalence of chronic illness in the U.S., a robust primary care system is necessary for the delivery of high-quality, efficient health care. Consequently there has been a renewed interest in primary care redesign based off the successes of innovative, primary care-based, quality improvement programs such as CCNC. An important, policy-relevant question is whether quality improvement strategies that are targeted to one patient group can improve care for non-targeted patients within the same practice. In other words, are there spillover effects like those seen with Medicare managed care wherein managed care-induced changes resulted in changes for both Medicare managed care and fee-for-service Medicare populations (Baker, 1997; Baker & Sharkarkumar, 1998; Clement & Gleason, 1992; Bradford & Krumholz, 2003; Mobley et al., 2011; Landon et al., 2011). Overall, I found minimal evidence of spillover in CCNC practices.

Several potential explanations for the lack of findings exist. First, it is possible that low statistical power and nuances of implementation made it difficult to detect spillover. As previously noted, the amount of pre-enrollment data for practices that joined CCNC was less than expected; this lack of variation probably contributed to wide confidence intervals and may have influenced the lack of significant spillover effects.

In addition, for the diabetes quality of care measures, one potential explanation for significant spillover in only one measure - receipt of A1c - is that improving A1c testing rates was one of the early targets of the CCNC diabetes program; the other diabetes quality of care measures (LDL, eye exam, and

attention for nephropathy) were incorporated into the program at later points in time. Thus spillover for these measures may have been small during my study period. Another reason for the lack of observed spillover for eye exams is that they are generally not performed in primary care practices and require multiple steps before a patient receives an eye exam (i.e., physician recommendation of for an eye exam, physician referral to an eye care professional, making an appointment, going to the appointment). This process of care may be similar for attention for nephropathy. In both cases achieving the quality metric is potentially influenced more by patient behaviors (e.g., ability/motivation to get to an appointment) and/or other provider behaviors (e.g., appointment availability of specialists) than by the primary care physician behavior. Conversely, both A1c and LDL testing are conceivably more under the direct control of a primary care provider and can be done during a single primary care visit. This explanation is supported by my finding that the greatest amount of between-practice heterogeneity occurred in the A1c and LDL models.

For utilization, I found significant changes only for PCP and total OP visits, though the effects were not in the hypothesized direction. My hypothesis was based on the assumption that patients needing greater access to and use of primary care have more PCP visits. However, PCP visits were fairly high for my patient sample (averaging almost five yearly visits) so patients may not have needed greater access to or use of primary care. In fact, it is possible that they received extra or unnecessary care. If so, reductions in PCP visits may indicate better utilization management in CCNC practices. On the other hand, it is also possible that by increasing access to and use of primary care for CCNC Medicaid patients, there was less available capacity for SHP patient visits. This "crowd-out" of visits seems most probable for small practices that have limited physician hours and resources. The sensitivity analyses indicate significant decreases in visits for only small and large practices. However, the results also show decreases in PCP visits without concurrent increases in IP or ED use, which suggests that the former "better utilization management" argument is more likely. For example, if a patient reduced visits due to

crowd-out only, one would expect to see increases in IP, ED, or specialty visits as a substitute for care, or as a result of less care, and my results do not display this pattern.

Additionally, the lack of significant decreases in IP and ED use may be due, in part, to low initial rates of IP and ED use in my sample; because they were low at the outset, there simply may not have been a way to significantly decrease them further. Furthermore, it can take time for improvements in care to affect patient utilization. This may be particularly true for IP and ED utilization as it may take more time for the CCNC-induced changes to demonstrate an effect. Practice participation in CCNC was associated with decreases in the probability of an IP admission or ED visit as hypothesized, but the effects were not significant; for these outcomes, there may not have been enough time to take significant effect.

A second potential explanation is that no spillover actually occurred. I based my hypotheses on the theory that physicians adopt a generalized style of delivering care across all patients (Eisenberg, 1979; Glied & Zivin, 2002; Frank & Zeckhauser, 2007), as a heuristic to lighten the cognitive load of medical decision-making (Tversky & Kahneman, 1974; Bornstein & Emler, 2001). However, physicians may be better at compartmentalizing patients and patient care than originally expected. For example, practices might have strategies for segmenting patients, such as flagging charts of Medicaid patients, which would allow providers to more easily alter care for particular groups of patients. Importantly, this type of segmentation may become more common with health information technology if specific reminders are linked to specific patients or payer groups, and should be considered in future analyses.

The increase in receipt of recommended diabetes care without a corresponding decrease in IP and ED utilization may indicate the need for individual care management to reduce IP and ED use. SHP patients do not receive such individual care management services – which may be critical to CCNC's success in reducing IP and ED utilization, as well as improving overall care – nor are the effects of CCNC care management expected to spillover. While I only found spillover for one diabetes quality measure,

the concurrent lack of spillover for ED and IP use may indicate the need for care management services to change ED and IP use.

A final potential explanation for the lack of spillover is that there were only minimal effects in the target population, so there was little to spillover. Unfortunately, I lacked comparable data for CCNC patients in my study practices. Without knowing the actual effect in the target population, it is hard to know if the lack of spillover was due to the possibilities described above or because there was not a large direct effect in the target population.

Policy Implications

In order to maximize the impact of state and national health policies, it is important to evaluate and understand the full effects of innovative primary care models. The degree to which physician behaviors spillover may influence the coordination of quality improvement efforts across payers. If behaviors spillover, one payer benefits from the quality improvements financed by another payer, suggesting that the costs could be shared across payers. In this case, however, I found little evidence of spillover, which suggests that all payers may need to participate in, and bear the costs of, quality improvement initiatives to improve care among their respective patients. Moreover, it may be beneficial for insurers to coordinate their efforts to efficiently improve care. For example, if multiple payers align quality improvement measures and goals, it may make it easier for physicians to change their behaviors and improve the quality of care for all of their patients.

The degree of spillover may also influence payment arrangements adopted for future models of care. While this study found some spillover of quality process measures, there was no evidence of spillovers for expenditures. Conversely, McWilliams et al. (2013) found Accountable Care Organization (ACO) spillover predominately among costs, similar to Medicare managed care studies (Baker, 1997; Mathematica Policy Research, 1992; Bradfor & Krumholz, 2003; Chernew et al., 2008). These differences

in areas of spillover, particularly costs, may result from differing payment structures in CCNC and the ACO. In CCNC, primary care providers receive a modest PMPM payment for managing and coordinating care, but otherwise are reimbursed for services on a fee-for-service basis (Steiner et al., 2008). In the ACO, "provider organizations bear financial risk for spending in excess of a global budget, [and] gain from reducing spending below budget" (McWilliams et al., 2013, p. 830). The explicit linkage of payments to reduced spending in the ACO may result in a focus on changing behaviors to reduce costs in the ACO – and thus spillovers in the focus area – while the lack of this linkage in CCNC may result in a focus on quality improvement and utilization management – and thus spillovers in these focus areas. Therefore policy makers may be able to enhance quality and efficiency across payers through choice of payment arrangements for models such as medical homes and ACOs. More research is needed to understand the intricacies of spillover in different care models and the degree to which spillover occurs over longer periods of time.

Limitations

It is important to note several limitations to this study. First, measurement error in identifying practices as CCNC and attributing patients to practices may have been present. However, because I used multiple methods to confirm practice identification and commonly used methods for attribution, I believe that this was not a large issue (CMS, 2012; The Brookings Institution and Dartmouth Institute, 2011). Second, it is possible that there are remaining confounding variables that I was not able to control for in my analyses, such as practice affiliation with an academic medical center, which could result in biased estimates. Third, during my study period two other quality improvement efforts in the state were implemented; this may limit my ability to determine the causal effect of practice participation in CCNC on outcome measures. However both programs had very small penetration during study period limiting the potential influence of these programs on patient outcomes. Lastly, CCNC

practice “participation” is in some ways a black box – while we know the components that are supposed to be implemented, we do not necessarily know the degree to which each practice actually implements changes. Practices that had greater levels of implementation may have had greater changes in physician behavior than practices that had lower levels of implementation. This makes my main CCNC variable somewhat noisy, in that the variable essentially treats all implementation levels as the same.

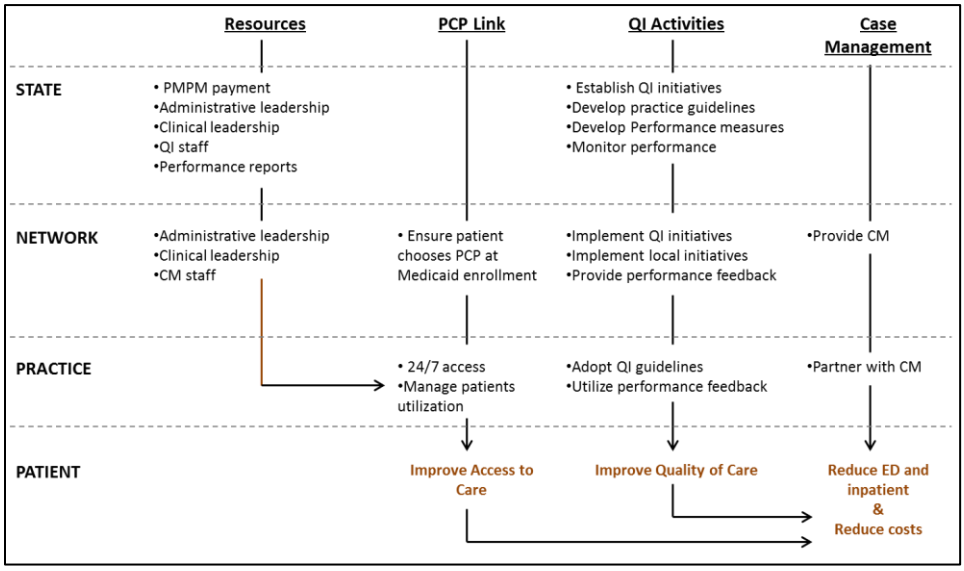
Conclusions

Efforts to improve the quality, comprehensiveness, and coordination of primary care are now focused on achieving improvement through innovative, quality improvement programs. Quality improvement initiatives have generally focused on two modes of implementation: 1) for a particular payer group (such as Medicaid), or 2) at the practice level for all patients. This study examines the extent to which a third mode of implementation occurs, wherein the intervention is implemented for one payer group but affects other patients in the practice. Overall this study found little evidence of spillover in CCNC. The results from this study aid in understanding the full effects of the innovative primary care models that are currently a focus of health policy, and indicate that spillover is not a foregone conclusion. My findings suggest the need for all insurers to participate in and coordinate efforts to improve the health and health care of patients.

APPENDIX: TABLES AND FIGURES

Chapter 1

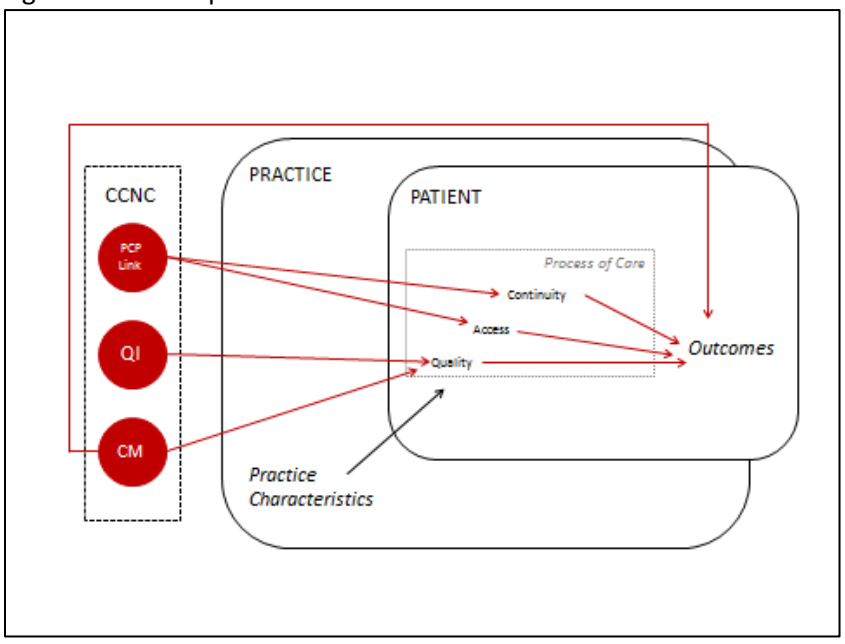
Figure 1.1: The CCNC Logic Model



Source: King, J. (2011). *Unpublished dissertation.*

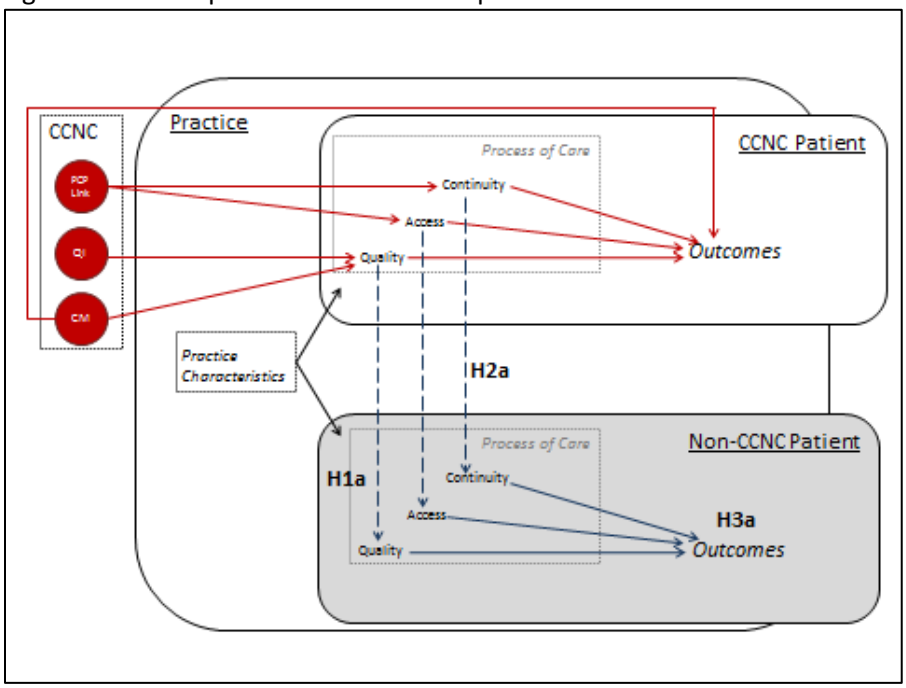
Chapter 2

Figure 2.1: Conceptual Model of CCNC



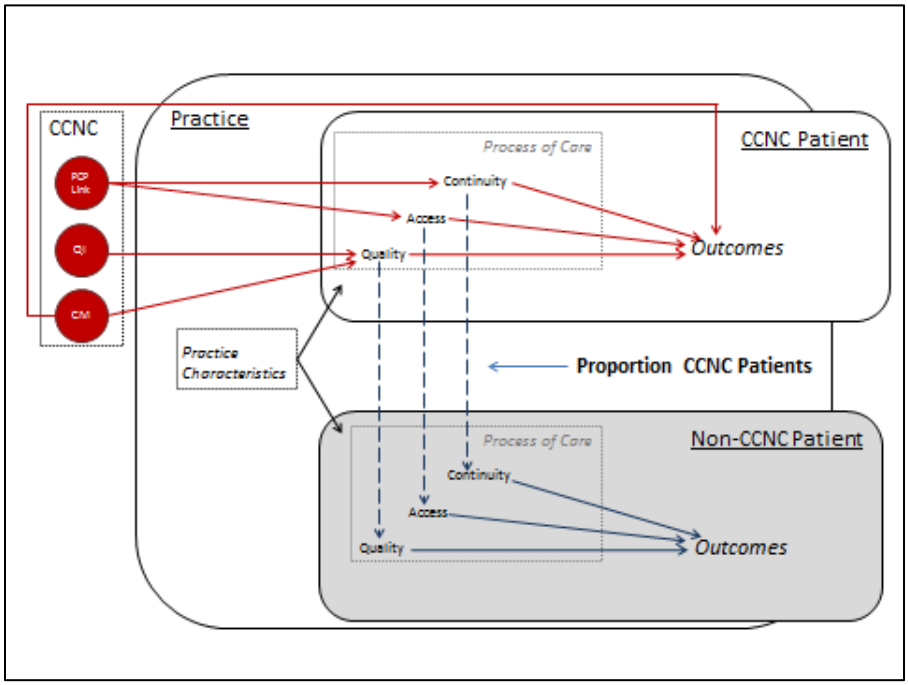
Note: Thin line from CM to Quality indicates that effect on Quality is small.

Figure 2.2: Conceptual Model of CCNC Spillover 1



Note: Blue dotted lines indicate spillover from main effect. Thickness of lines indicate degree of effect (i.e., thinner line indicates smaller effect).

Figure 2.3: Conceptual Model of CCNC Spillover2



Note: Blue dotted lines indicate spillover from main effect. Thickness of lines indicate degree of effect (i.e., thinner line indicates smaller effect).

Chapter 3

Figure 3.1: SHP Diabetes Patient Sample Selection

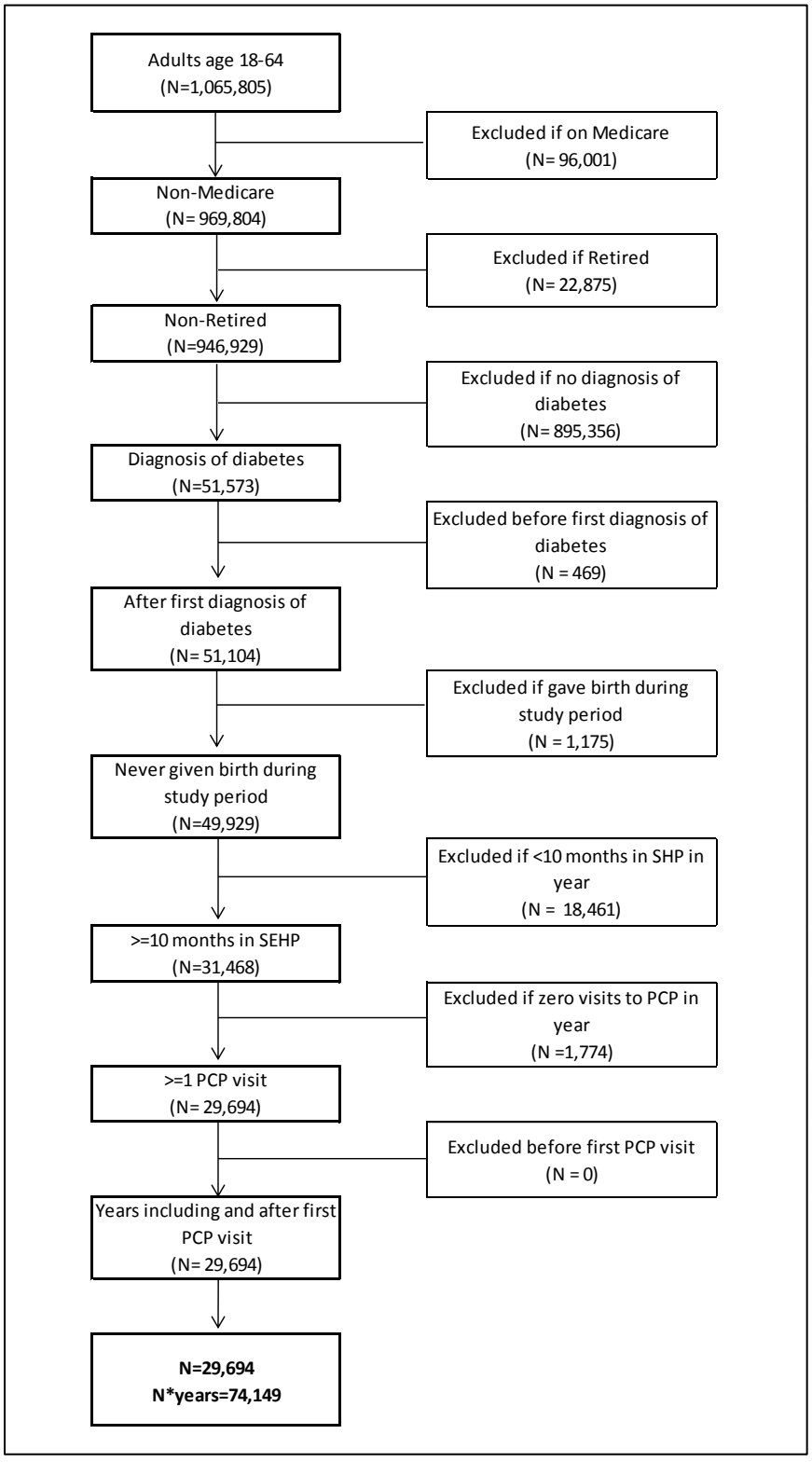


Figure 3.2: Example of Incomplete Enrollment Data

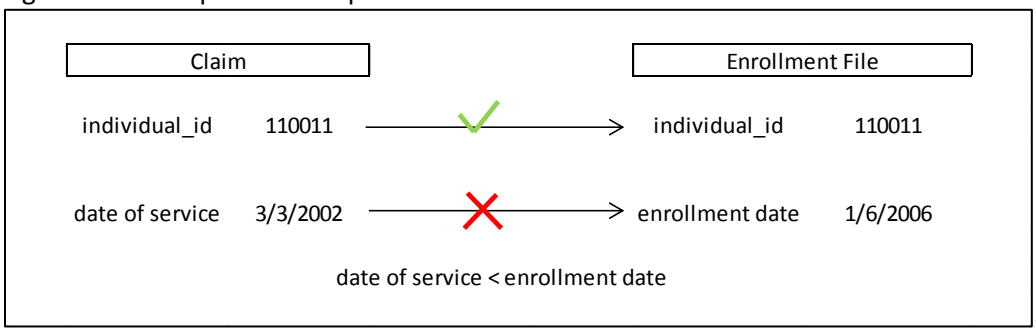


Figure 3.3: Example of *individualid* Recovery for Enrollment Data

Claim			Raw Enrollment file		
individual_id	newid	date of service	individual_id	newid	enrollment date
110011	465	3/3/2002		465	1/1/2002
110011	465	4/12/2002	110011	615	1/6/2006
110011	615	3/4/2006	12022	617	11/24/2005
110011	615	12/3/2006	12354	211	3/4/2002

Figure 3.4: SHP Servicing Providers within Payment Providers

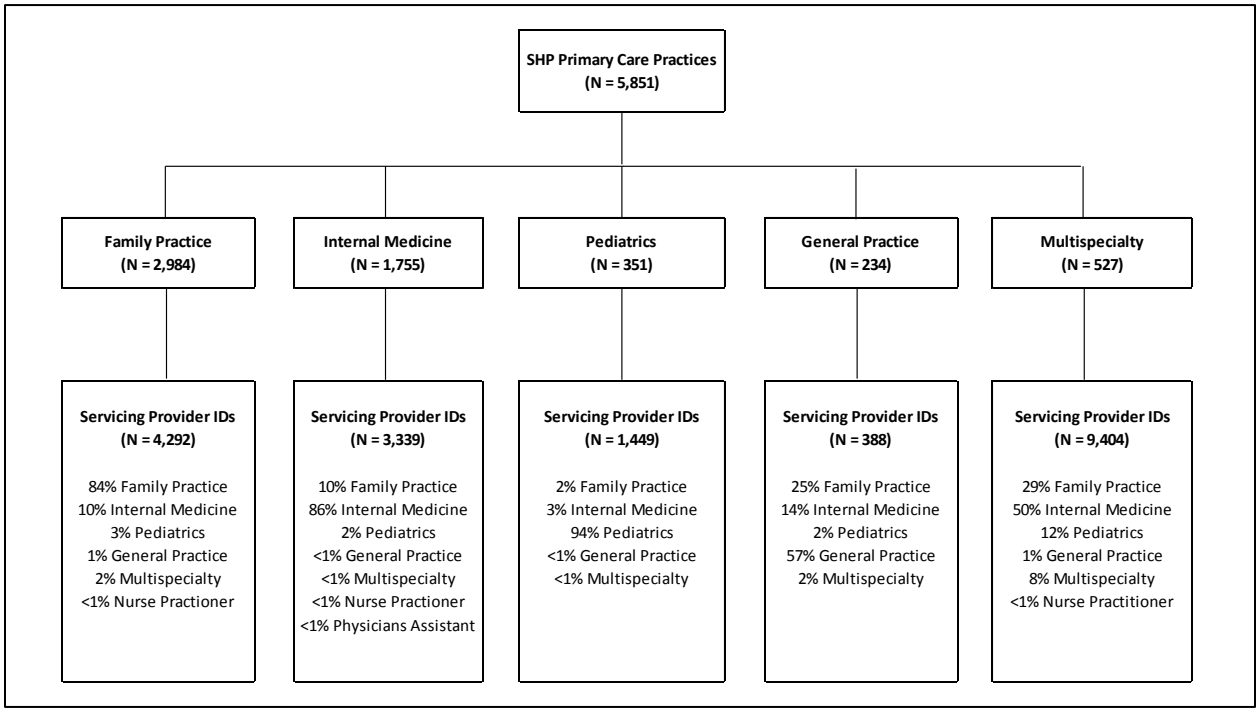


Figure 3.5: SHP Practice Matching to CCNC Practices

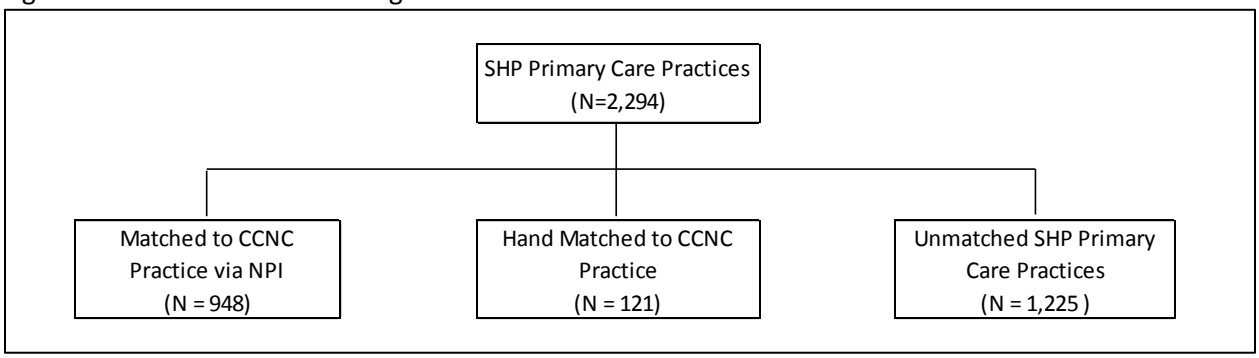


Figure 3.6: Example of Identifying and Combining Multiple Practice Entries

	Practice Name	Payment Provider ID	NPI	SHP Enrollment Date	SHP Disenrollment Date	New Practice ID
Example 1	Cajahs Mountain Family Medical Ctr	12000	.	4/1/1997	12/31/2006	2
	Cajahs Mtn Family Med Care	14506	1235227257	1/1/2007		2
Example 2	Steven R. Lawson MD	18680	1467414250	9/22/2005	9/29/2009	3
	Steven R. Lawson MD	17546	1467414250	5/24/1997	7/31/2009	3

Figure 3.7: Example of Updated Attribution of SHP Patients to Primary Care Practices

	Practice Name	Payment Provider ID	NPI	SHP Enrollment Date	SHP Disenrollment Date	Year	Patient attributed to before combination	Patient attributed to after combination
Example 1	Cajahs Mountain Family Medical Ctr	12000	.	4/1/1997	12/31/2006	2006	12000	2
	Cajahs Mtn Family Med Care	14506	1235227257	1/1/2007	.	2007	14506	2
Example 2	Steven R. Lawson MD	17546	1467414250	5/24/1997	7/31/2009	2002	17546	3
	Steven R. Lawson MD	18680	1467414250	9/22/2005	9/29/2009	2006	18680	3

Chapter 4

Table 4.1: ICD-9 and CPT Codes

	ICD-9 Codes	CPT Codes
Outpatient Visit – to identify total OP visits and COC		92002, 92004, 92012, 92014-99205, 99211-99215, 99217-99220, 99241-99245, 99347-99350, 99384-99387, 99394-99397, 99401-99404, 99411, 99412, 99420, 99429, 99455 99456
A1c test		83036, 83037
LDL test		80061, 83700, 83701, 83704, 83721
Eye exam		67028, 67030, 67031, 67036, 67038-67043, 67101, 67105, 67107, 67108, 67110, 67112, 67113, 67121, 67141, 67145, 67208, 67210, 67218, 67220, 67221, 67227, 67228, 92002, 92004, 92012, 92014, 92018, 92019, 92225, 92226, 92230, 92235, 92240, 92250, 92260, 99203-99205, 99213-99215, 99242-99245, , S0620, S0621, S3000 AND (specialty: ophthalmologist or optometrist)
	V72.0 AND (specialty: ophthalmologist or optometrist)	
		2022F, 2024F, 2026F, 3072F, S0625, regardless of provider type
Attention for nephropathy		36145, 36800, 36810, 36815, 36818, 36819-36821, 36831-36833, 50300, 50320, 50340, 50360, 50365, 50370, 50380, 90920, 90921, 90924, 90925, 90935, 90937, 90939, 90940, 90945, 90947, 90989, 90993, 90997, 90999, 99512, 3066F, G0257, G0314-G0319, G0322, G0323, G0326, G0327, G0392, G0393, S9339, 82042, 82043, 82044, 84156. 3060F, 3061F, 81000, 81002, 81003, 81005, 3062F
	250.4, 403, 404, 405.01, 405.11, 405.91, 580-588, 753.0, 753.1, 791.0, V42.0,V45.1, V56	
	ACE/ARB Prescription fill	
	Nephrologist visit during year	
Breast cancer screening		77055-77057, G0202, G0204, G0206
Cervical cancer screening		88141, 88150, 88175,G0123, Q0091
Flu shot		90654, 90655, 90656, 90657, 90658, 90660-62, 90672, 90685, 90686, 90688

Table 4.2: Standardized Differences Before and After Trimming

	Before Trimming			After Trimming		
Variable	CCNC (N=858)	Not CCNC (N=1,180)	Standardized Differnce	CCNC (N=849)	Not CCNC (N=1,177)	Standardized Differnce
# Primary care providers	3.92	2.67	0.226	3.69	2.49	0.330
Community based practice	0.93	0.93	0.006	0.94	0.93	0.016
Proportion below poverty, county	0.15	0.13	0.346	0.15	0.13	0.348
Non-Hispanic, non-white, county	0.29	0.27	0.119	0.29	0.27	0.117
Hispanic	0.13	0.13	0.024	0.13	0.13	0.029
Primary care providers/10,000 pop	7.79	9.13	0.304	7.72	9.08	0.320
Urban county	0.55	0.69	0.294	0.55	0.69	0.298
Nonrural county	0.39	0.28	0.236	0.39	0.28	0.240
Rural county	0.06	0.03	0.149	0.06	0.03	0.147

Chapter 5

Table 5.1: Characteristics of SHP Diabetes Patients

	Overall (Mean)	Not CCNC (Mean)	CCNC (Mean)
Analysis population size			
Patients	26,907	11,050	15,857
Patient-years	65,218	34,725	30,493
Practices	2,026	1,177	849
Practice-years	7,082	4,502	2,580
Patient level variables			
Age	49.40	49.48	49.31**
	(8.09)	(7.99)	(8.21)
Male	41.73%	41.71%	41.75%
Charlson index	1.37	1.36	1.37
	(1.14)	(1.11)	(1.17)
SHP Plan			
CCM	3.98%	4.53%	3.35%**
Smartchoice	61.19%	62.57%	59.63%**
Smartchoice basic	29.75%	27.74%	32.05%**
Smartchoice plus	5.08%	5.17%	4.97%
Eligibility			
Subscriber	87.69%	87.32%	88.11%**
Spouse	11.91%	12.30%	11.47%**
Other	0.40%	0.38%	0.42%
Practice level variables			
Participation in CCNC	46.76%	0%	100%
Ever CCNC	54.70%	14.92%	100.00%
CCNC early adopter	23.91%	4.13%	46.43%
Size	7.88	6.42	9.55**
	(12.37)	(9.14)	(15.07)
Community based	87.83%	90.26%	85.06%**
Multisite	0.64%	0.24%	1.10%**
County controls			
Primary care providers/10,000	9.80	10.19	9.36**
	(5.52)	(5.48)	(5.54)
Proportion in poverty	0.15	0.139	0.164**
	(0.047)	(0.042)	(0.050)
Proportion white, non-Hispanic	0.53	0.54	0.52**
	(0.15)	(0.14)	(0.17)
Proportion nonwhite, non-Hispanic	0.31	0.30	0.32**
	(0.15)	(0.13)	(0.17)
Proportion Hispanic	0.16	0.159	0.159
	(0.15)	(0.056)	(0.075)
Rural-urban			
Urban	68.76%	75.63%	60.94%**
Nonrural	28.73%	23.35%	34.86%**
Rural	2.51%	1.03%	4.20%**

Notes: Standard deviations reported in parentheses.

* p<0.05 ** p<0.01

Table 5.2: Characteristics of SHP Primary Care Practices

	Overall (Mean) N = 2,026 N*t = 7,082	Not CCNC (Mean) N = 1,177 N*t = 4,502	CCNC (Mean) N = 849 N*t = 2,580
Practice variables			
Participation in CCNC	36.43%	0.00%	100.00%
Ever CCNC	48.19%	18.50%	100.00%
CCNC early adopter	21.05%	6.31%	46.78%
Size	3.40	2.96**	4.18
	(4.86)	(4.23)	(5.72)
Community based	94.15%	94.09%	94.26%
Multisite	0.40%	0.24%	0.66%
County controls			
Primary care providers/10,000	8.72	9.14**	8.00
	(4.47)	(4.58)	(4.17)
Proportion in poverty	0.149	0.141**	0.163
	(0.046)	(0.040)	(0.052)
Proportion white, non-Hispanic	0.56	0.57**	0.55
	(0.16)	(0.15)	(0.18)
Proportion nonwhite, non-Hispanic	0.29	0.28**	0.30
	(0.16)	(0.14)	(0.17)
Proportion Hispanic	0.152	0.0151*	0.155
	(0.068)	(0.063)	(0.076)
Rural-urban			
Urban	64.16%	68.33%**	56.90%
Nonrural	31.83%	28.94%**	36.86%
Rural	4.01%	2.73%**	6.24%

Notes: Standard deviations reported in parentheses.

* p<0.05 ** p<0.01

Table 5.3: Overall Unadjusted Performance

	Overall (Mean) N=26,907 N*t=65218	Not CCNC (Mean) N=11,050 N*t=34,725	CCNC (Mean) N=15,857 N=30,493
A1c	76.23%	78.31%	73.87%**
Lipid	69.64%	71.43%	67.60%**
Eye exam	36.66%	36.59%	36.74%
Nephropathy	80.97%	81.35%	80.54%
Flu shot	33.85%	33.14%	34.67%**
Cervical cancer screen			
Breast cancer screen			
Total outpatient visits	7.74 (5.73)	7.83 (5.73)	7.63*** (5.73)
Primary care vists	4.73 (3.69)	4.73 (3.65)	4.74 (3.74)
Inpatient admissions	0.14 (0.52)	0.13 (0.51)	0.14 (0.54)
Emergency department visits	0.26 (0.75)	0.23 (0.69)	0.28** (0.81)
Continuity of care			
Total costs	8547.47 (20321.40)	8384.19 (19286.86)	8733.42* (21437.62)

Notes: Standard deviations reported in parentheses.

* p<0.05 ** p<0.01

Table 5.4a: Multi-Level Odds Ratios of the Effect of CCNC on Receipt of Yearly Diabetes Measures

	>=1 A1C Test		>=1 LDL Test		>=1 Eye Exam		Attention for Nephropathy	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC	1.18**	[1.05,1.32]	1.04	[0.94,1.14]	1.03	[0.95,1.12]	1.06	[0.96,1.17]
	(AME = 0.021)		(AME = 0.0057)		(AME = 0.0069)		(AME = 0.0076)	
Ever CCNC	0.74**	[0.61,0.90]	0.76**	[0.64,0.90]	0.97	[0.89,1.06]	0.98	[0.86,1.10]
CCNC Early Adopter	0.91	[0.74,1.13]	1.05	[0.86,1.27]	0.93	[0.87,1.01]	0.92	[0.81,1.03]
Person-level controls								
Age	1.05***	[1.02,1.07]	1.11***	[1.09,1.13]	0.97***	[0.95,0.99]	1.10***	[1.08,1.12]
Age^2	1.00*	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]
Male	1.17***	[1.12,1.23]	1.13***	[1.09,1.18]	0.83***	[0.80,0.85]	0.99	[0.95,1.04]
Charlson Index	4.55***	[4.34,4.77]	1.55***	[1.49,1.61]	1.71***	[1.66,1.77]	2.00***	[1.92,2.08]
Charlson Index^2	0.86***	[0.85,0.86]	0.95***	[0.95,0.96]	0.95***	[0.95,0.96]	0.94***	[0.94,0.95]
Eligibility (omitted = subscriber)								
Spouse	0.81***	[0.76,0.88]	0.85***	[0.79,0.90]	0.96	[0.91,1.02]	0.94	[0.88,1.01]
Other	1.39	[0.97,2.00]	1.16	[0.84,1.61]	0.91	[0.67,1.24]	1.07	[0.79,1.45]
Plan Type (omitted = CMM)								
Smart Choice	1.26***	[1.12,1.42]	1.29***	[1.16,1.42]	1.36***	[1.24,1.50]	1.21***	[1.09,1.34]
Smart Choice Basic	1.19**	[1.06,1.35]	1.20***	[1.08,1.33]	1.05	[0.95,1.15]	1.13*	[1.02,1.26]
Smart Choice Plus	1.26**	[1.08,1.47]	1.30***	[1.14,1.48]	1.33***	[1.19,1.50]	1.31***	[1.14,1.51]
Practice and county-level controls								
# Primary Care Providers	1.00	[0.99,1.01]	1.00	[0.99,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.01]
Multisite Practice	1.16	[0.40,3.37]	1.51	[0.56,4.05]	1.11	[0.80,1.55]	0.74	[0.43,1.27]
Rural-Urban								
Non-urban, Non-rural	0.68***	[0.58,0.81]	0.76***	[0.65,0.89]	0.96	[0.90,1.03]	0.87**	[0.79,0.97]
Rural	0.43***	[0.29,0.64]	0.39***	[0.28,0.56]	0.80**	[0.68,0.94]	0.91	[0.73,1.15]
Community-based Practice	1.39*	[1.04,1.85]	1.34*	[1.03,1.74]	1.00	[0.91,1.11]	1.08	[0.91,1.28]
County Proportion Poverty	1.90	[0.36,10.13]	0.12**	[0.03,0.54]	0.56	[0.26,1.22]	0.10***	[0.03,0.33]
Primary Care Providers/10,000 Population	0.97**	[0.96,0.99]	0.96***	[0.95,0.98]	1.02***	[1.01,1.02]	0.99**	[0.98,1.00]
County Proportion Race/Ethnicity								
Non-white, not Hispanic	0.63	[0.37,1.05]	0.82	[0.51,1.31]	0.76*	[0.62,0.94]	2.27***	[1.65,3.12]
Hispanic	2.77	[0.99,7.78]	2.88*	[1.13,7.31]	0.66*	[0.43,0.99]	2.25*	[1.21,4.20]
Year								
2005	0.91	[0.81,1.02]	1.54***	[1.40,1.70]	0.89**	[0.83,0.97]	1.46***	[1.33,1.61]
2006	0.85**	[0.75,0.95]	1.61***	[1.46,1.77]	0.95	[0.88,1.03]	1.44***	[1.31,1.58]
2007	0.92	[0.82,1.04]	1.85***	[1.68,2.04]	1.42***	[1.31,1.53]	1.55***	[1.40,1.70]
2008	0.91	[0.81,1.02]	1.93***	[1.75,2.13]	1.57***	[1.46,1.70]	1.52***	[1.38,1.67]
Constant	0.18***	[0.09,0.37]	0.05***	[0.03,0.09]	0.29***	[0.18,0.47]	0.10***	[0.06,0.17]
Average practice intercept	1.33***	[1.27,1.40]	1.21***	[1.16,1.27]	0.31***	[0.28,0.34]	0.61***	[0.57,0.65]
N	65218		65218		65218		65218	

Notes: A1c is hemoglobin A1c test, LDL is low-density lipoprotein test. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.4b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models

	>=1 A1C	>=1 LDL	>=1 Eye Exam	Attention for Nephropathy
CCNC				
MLM AME	0.021**	0.006	0.007	0.0076
	[0.0064,0.0346]	[-0.010,0.022]	[-0.011,0.025]	[-0.0065,0.0217]
FE AME	0.020	0.009	0.004	0.0126
	[-0.0031,0.0425]	[-0.015,0.033]	[-0.015,0.023]	[-0.0057,0.0309]

Notes: Logit models used for mult-level models. Cluster robust linear probability models used for fixed-effects models.

*p<0.05,**p<0.01,***p<0.001

Table 5.5a: Multi-Level Odds Ratios of the Moderating Effect of CCNC Patient Load on Receipt of Yearly Diabetes Measures

	>=1 A1C Test		>=1 LDL Test		>=1 Eye Exam		Attention for Nephropathy	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC Patients (omitted = Very Low)								
Low	1.19	[0.92,1.53]	1.08	[0.87,1.33]	0.97	[0.87,1.10]	0.85	[0.72,1.01]
	(AME = 0.022)		(AME = 0.001)		(AME = -0.006)		(AME = -0.023)	
Medium	1.07	[0.81,1.41]	1.05	[0.82,1.33]	0.95	[0.84,1.07]	0.97	[0.80,1.16]
	(AME = 0.007)		(AME = 0.007)		(AME = -0.011)		(AME = -0.005)	
High	0.88	[0.65,1.18]	0.87	[0.67,1.13]	0.97	[0.85,1.11]	0.94	[0.77,1.15]
	(AME = -0.018)		(AME = -0.023)		(AME = -0.006)		(AME = -0.009)	
Very High	1.03	[0.76,1.40]	0.82	[0.63,1.08]	0.90	[0.79,1.02]	0.94	[0.78,1.15]
	(AME = 0.004)		(AME = -0.032)		(AME = -0.024)		(AME = -0.008)	
CCNC Early Adopter	1.00	[1.00,1.01]	0.99*	[0.99,1.00]	1.00	[1.00,1.01]	1.00	[1.00,1.01]
Person-level controls								
Age	1.01	[0.98,1.05]	1.09***	[1.05,1.12]	0.97*	[0.94,0.99]	1.10***	[1.07,1.14]
Age^2	1.00	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]
Male	1.17***	[1.09,1.25]	1.10**	[1.04,1.17]	0.82***	[0.78,0.86]	1.03	[0.96,1.09]
Charlson Index	4.71***	[4.39,5.05]	1.56***	[1.48,1.65]	1.69***	[1.61,1.78]	2.07***	[1.95,2.20]
Charlson Index^2	0.86***	[0.85,0.86]	0.95***	[0.94,0.96]	0.95***	[0.95,0.96]	0.94***	[0.93,0.95]
Eligibility (omitted = subscriber)								
Spouse	0.77***	[0.69,0.86]	0.81***	[0.74,0.89]	0.93	[0.86,1.01]	0.94	[0.85,1.04]
Other	0.86	[0.51,1.45]	0.74	[0.45,1.21]	0.91	[0.59,1.42]	0.94	[0.61,1.45]
Plan Type (omitted = CMM)								
Smart Choice	1.14	[0.95,1.38]	1.34***	[1.14,1.57]	1.39***	[1.20,1.60]	1.26**	[1.07,1.49]
Smart Choice Basic	1.06	[0.87,1.28]	1.26**	[1.07,1.49]	1.06	[0.91,1.23]	1.13	[0.96,1.34]
Smart Choice Plus	1.12	[0.89,1.42]	1.19	[0.98,1.46]	1.37***	[1.14,1.63]	1.23	[1.00,1.52]
Practice and county-level controls								
# Primary Care Providers	0.91	[0.72,1.15]	1.08	[0.87,1.34]	0.93	[0.86,1.01]	0.92	[0.81,1.05]
Multisite Practice	1.33	[0.37,4.78]	1.37	[0.43,4.38]	1.21	[0.85,1.72]	0.93	[0.50,1.71]
Rural-Urban								
Non-urban, Non-rural	0.84	[0.64,1.10]	0.95	[0.75,1.22]	0.84***	[0.77,0.93]	0.85*	[0.73,0.99]
Rural	0.69	[0.41,1.15]	0.52**	[0.33,0.83]	0.73***	[0.61,0.88]	0.85	[0.65,1.12]
Community-based Practice	0.76	[0.46,1.24]	1.00	[0.64,1.56]	1.03	[0.89,1.19]	0.77*	[0.59,0.99]
County Proportion Poverty	3.11	[0.26,36.56]	0.05**	[0.01,0.49]	2.14	[0.73,6.30]	0.29	[0.06,1.49]
Primary Care Providers/10,000 Population	0.95***	[0.92,0.97]	0.93***	[0.91,0.95]	1.01**	[1.01,1.02]	0.97***	[0.96,0.99]
County Proportion Race/Ethnicity								
Non-white, not Hispanic	0.55	[0.25,1.20]	0.72	[0.36,1.44]	0.58***	[0.44,0.78]	1.58*	[1.00,2.49]
Hispanic	1.17	[0.26,5.24]	2.33	[0.60,9.02]	0.60	[0.35,1.02]	1.38	[0.59,3.20]
Year								
2005	0.85	[0.62,1.17]	1.79***	[1.41,2.27]	0.99	[0.80,1.22]	1.59***	[1.26,2.02]
2006	0.80	[0.58,1.09]	1.80***	[1.42,2.28]	1.01	[0.82,1.25]	1.64***	[1.30,2.08]
2007	0.86	[0.63,1.17]	2.10***	[1.66,2.66]	1.49***	[1.21,1.83]	1.71***	[1.36,2.16]
2008	0.83	[0.61,1.14]	2.11***	[1.66,2.67]	1.64***	[1.33,2.01]	1.66***	[1.32,2.10]
Constant	0.92	[0.31,2.72]	0.11***	[0.04,0.29]	0.28***	[0.14,0.56]	0.14***	[0.06,0.31]
Average practice intercept	1.42***	[1.32,1.52]	1.28***	[1.20,1.37]	0.28***	[0.24,0.32]	0.60***	[0.54,0.66]
N	30233		30233		30233		30233	

Notes : A1c is hemoglobin A1c test, LDL is low-density lipoprotein test. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.5b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed-Effects Models

	>=1 A1C	>=1 LDL	>=1 Eye Exam	Attention for Nephropathy
CCNC Patients (omitted=Very Low)				
Low				
MLM AME	0.022 [-0.0088,0.0527]	0.001 [-0.032,0.034]	- 0.006 [-0.031,0.019]	- 0.023 [-0.0493,0.0033]
FE AME	0.012 [-0.034,0.057]	0.012 [-0.030,0.054]	- 0.025 [-0.079,0.028]	- 0.061** [-0.100,-0.021]
Medium				
MLM AME	0.007 [-0.034,0.048]	0.007 [-0.037,0.051]	- 0.011 [-0.041,0.019]	- 0.005 [-0.036,0.026]
FE AME	- 0.010 [-0.071,0.051]	0.002 [-0.054,0.058]	- 0.033 [-0.096,0.030]	- 0.036 [-0.088,0.016]
High				
MLM AME	- 0.018 [-0.061,0.025]	- 0.023 [-0.068,0.022]	- 0.006 [-0.035,0.024]	- 0.009 [-0.039,0.021]
FE AME	- 0.036 [-0.107,0.035]	- 0.033 [-0.102,0.037]	- 0.036 [-0.105,0.033]	- 0.046 [-0.106,0.014]
Very High				
MLM AME	0.004 [-0.037,0.045]	- 0.032 [-0.078,0.014]	- 0.024 [-0.0518,0.0038]	- 0.008 [-0.037,0.021]
FE AME	- 0.018 [-0.096,0.059]	- 0.051 [-0.134,0.031]	- 0.045 [-0.120,0.029]	- 0.050 [-0.113,0.012]

Notes: Logit models used for mult-level models. Cluster robust linear probability models used for fixed-effects models.

*p<0.05,**p<0.01,***p<0.001

Table 5.6a: Multi-Level Odds Ratios of the Effect of CCNC on Receipt of Preventive Measures

	>=1 Flu Shot		>=1 Breast Cancer Screen		>=1 Cervical Cancer Screen	
	OR	95% CI	OR	95% CI	OR	95% CI
CCNC	1.02	[0.93,1.12]	1.08	[0.89,1.33]	0.86*	[0.75,0.99]
	(AME = 0.004)		(AME = 0.012)		(AME = -0.023)	
Ever CCNC	0.93	[0.83,1.04]	0.81*	[0.65,0.99]	1.05	[0.90,1.23]
CCNC Early Adopter	0.98	[0.89,1.08]	0.86*	[0.76,0.98]	0.85*	[0.75,0.98]
Person-level controls						
Age	0.98*	[0.96,1.00]	1.13**	[1.04,1.23]	0.99	[0.96,1.02]
Age^2	1.00***	[1.00,1.00]	1.00*	[1.00,1.00]	1.00	[1.00,1.00]
Male	0.83***	[0.80,0.86]	—	—	—	—
Charlson Index	1.32***	[1.28,1.37]	1.01	[0.96,1.06]	0.92***	[0.88,0.97]
Charlson Index^2	0.97***	[0.97,0.98]	1.00	[0.99,1.01]	1.00	[1.00,1.01]
Eligibility (omitted = subscriber)						
Spouse	0.82***	[0.77,0.87]	0.88*	[0.77,0.99]	0.83**	[0.73,0.93]
Other	0.66*	[0.46,0.94]	—	—	0.94	[0.49,1.80]
Plan Type (omitted = CMM)						
Smart Choice	1.16**	[1.05,1.29]	1.33*	[1.06,1.66]	1.24**	[1.05,1.45]
Smart Choice Basic	0.91	[0.82,1.02]	1.07	[0.85,1.34]	1.01	[0.86,1.19]
Smart Choice Plus	1.07	[0.94,1.21]	1.15	[0.89,1.49]	1.07	[0.88,1.30]
Practice and county-level controls						
# Primary Care Providers	1.00	[1.00,1.00]	1.01**	[1.00,1.02]	0.99*	[0.99,1.00]
Multisite Practice	1.00	[0.64,1.57]	1.09	[0.64,1.85]	1.92*	[1.09,3.40]
Rural-Urban						
Non-urban, Non-rural	0.91*	[0.84,1.00]	0.84**	[0.75,0.94]	0.82***	[0.73,0.92]
Rural	0.90	[0.74,1.09]	0.72*	[0.55,0.95]	0.58***	[0.43,0.79]
Community-based Practice	1.01	[0.88,1.16]	0.92	[0.77,1.09]	1.07	[0.89,1.29]
County Poverty	1.44	[0.55,3.80]	8.45**	[2.32,30.77]	0.18*	[0.05,0.70]
Primary Care Providers/10,000 Population	1.01*	[1.00,1.02]	1.00	[0.99,1.01]	0.97***	[0.96,0.98]
County Race/Ethnicity						
Non-white, not Hispanic	0.33***	[0.25,0.43]	0.69*	[0.49,0.99]	1.92***	[1.32,2.80]
Hispanic	0.74	[0.44,1.24]	0.47*	[0.24,0.93]	1.64	[0.80,3.38]
Year						
2005	0.74***	[0.68,0.82]	2.36***	[1.66,3.36]	2.22***	[1.90,2.58]
2006	0.79***	[0.72,0.86]	6.09***	[4.36,8.50]	3.02***	[2.60,3.50]
2007	3.39***	[3.10,3.70]	74.67***	[53.80,103.63]	3.44***	[2.97,3.99]
2008	3.58***	[3.27,3.91]	79.41***	[57.16,110.31]	3.83***	[3.30,4.44]
Constant	0.20***	[0.12,0.34]	0.00***	[0.00,0.00]	0.22***	[0.11,0.47]
Average practice intercept	0.48***	[0.44,0.51]	0.49***	[0.44,0.54]	0.61***	[0.57,0.66]
N	65218		33076		37902	

Notes : Breast cancer screening only for women ages of 40-74. Cervical cancer screening only for women ages 21-64. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.6b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models

CCNC	>=1 Flu Shot	>=1 Breast Cancer Screen	>=1 Cervical Cancer Screen
MLM AME	0.004	0.012	- 0.0233*
	[-0.014,0.022]	[-0.018,0.042]	[-0.0447,-0.0019]
FE AME	0.001	- 0.002	- 0.0239*
	[-0.020,0.021]	[-0.025,0.021]	[-0.0474,-0.0004]

Notes: Logit models used for mult-level models. Cluster robust linear probability models used for fixed-effects models.

*p<0.05,**p<0.01,***p<0.001

Table 5.7a: Multi-Level Estimates of the Effect of CCNC on Yearly Health Care Utilization

	>=1 IP Admission		>=1 ED Visit		# PCP Visits		# OP Visits		Continuity of Care	
	OR	95% CI	OR	95% CI	IRR	95% CI	IRR	95% CI	Coeff.	95% CI
CCNC	0.93	[0.82,1.05]	0.99	[0.90,1.10]	0.95***	[0.93,0.97]	0.96***	[0.94,0.97]	-0.01173	[-0.02442,0.00096]
	(AME = -0.006)		(AME = -0.001)		(AME = -0.287)		(AME = -0.294)		(AME = -0.0071)	
Ever CCNC	1.08	[0.95,1.23]	1.12*	[1.01,1.25]	1.03	[0.98,1.07]	1.01	[0.97,1.05]	0.028***	[0.013,0.044]
CCNC Early Adopter	1.08	[0.98,1.19]	1.13**	[1.04,1.24]	1.00	[0.94,1.05]	0.96	[0.92,1.00]	0.0173**	[0.0044,0.0301]
Person-level controls										
Age	0.97*	[0.94,1.00]	0.95***	[0.93,0.97]	1.00	[0.99,1.00]	0.98***	[0.98,0.98]	0.013***	[0.010,0.016]
Age^2	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00*	[1.00,1.00]	1.00***	[1.00,1.00]	- 0.00015***	[-0.00018,-0.0012]
Male	0.94*	[0.89,1.00]	0.74***	[0.71,0.77]	0.80***	[0.79,0.81]	0.76***	[0.76,0.77]	0.060***	[0.054,0.067]
Charlson Index	3.14***	[3.00,3.29]	1.84***	[1.77,1.91]	1.43***	[1.42,1.44]	1.45***	[1.45,1.46]	- 0.046***	[-0.051,-0.042]
Charlson Index^2	0.93***	[0.93,0.94]	0.96***	[0.95,0.96]	0.98***	[0.98,0.98]	0.98***	[0.98,0.98]	0.0027***	[0.0021,0.0032]
Eligibility (omitted = subscriber)										
Spouse	1.26***	[1.16,1.37]	0.96	[0.90,1.03]	1.07***	[1.05,1.08]	1.09***	[1.08,1.10]	- 0.025***	[-0.033,-0.016]
Other	1.01	[0.62,1.62]	0.61**	[0.43,0.86]	0.76***	[0.70,0.83]	0.80***	[0.76,0.85]	- 0.003	[-0.049,0.042]
Plan Type (omitted = CMM)										
Smart Choice	0.77***	[0.68,0.87]	0.75***	[0.67,0.83]	1.02	[1.00,1.04]	1.04***	[1.02,1.05]	- 0.0147*	[-0.0283,-0.0011]
Smart Choice Basic	0.76***	[0.67,0.88]	0.88*	[0.79,0.98]	0.96**	[0.94,0.99]	0.94***	[0.92,0.95]	0.01427*	[0.00014,0.02840]
Smart Choice Plus	1.20*	[1.02,1.41]	0.95	[0.84,1.09]	1.16***	[1.13,1.19]	1.19***	[1.17,1.22]	- 0.029***	[-0.046,-0.012]
Practice and county-level controls										
# Primary Care Providers	1.00	[1.00,1.00]	1.00	[0.99,1.00]	1.00**	[1.00,1.00]	1.00*	[1.00,1.00]	- 0.00017	[-0.00066,0.00031]
Multisite Practice	0.88	[0.56,1.37]	0.89	[0.60,1.33]	1.16	[0.88,1.54]	1.18	[0.95,1.47]	- 0.007	[-0.084,0.071]
Rural-Urban										
Non-urban, Non-rural	1.07	[0.98,1.18]	1.16***	[1.07,1.25]	1.02	[0.98,1.07]	0.97*	[0.93,1.00]	0.0072	[-0.0048,0.0192]
Rural	0.84	[0.67,1.06]	0.99	[0.82,1.19]	1.00	[0.91,1.10]	0.95	[0.88,1.03]	0.038**	[0.011,0.064]
Community-based Practice	0.86*	[0.76,0.97]	0.89	[0.79,1.00]	0.86***	[0.80,0.92]	0.94*	[0.89,0.99]	0.0221*	[0.0013,0.0429]
County Proportion Poverty	0.94	[0.32,2.77]	0.43	[0.17,1.10]	1.76**	[1.24,2.49]	1.19	[0.91,1.55]	0.11	[-0.01,0.23]
Primary Care Providers/10,000 Population	0.99	[0.99,1.00]	1.00	[0.99,1.01]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	0.00054	[-0.00054,0.00161]
County Proportion Race/Ethnicity										
Non-white, not Hispanic	0.99	[0.74,1.33]	1.39*	[1.08,1.80]	1.02	[0.90,1.15]	0.97	[0.88,1.07]	- 0.011	[-0.048,0.025]
Hispanic	0.96	[0.54,1.68]	0.87	[0.53,1.42]	1.27	[0.99,1.62]	0.9	[0.74,1.08]	0.0845*	[0.0078,0.1611]
Year										
2005	1.02	[0.90,1.16]	1.25***	[1.13,1.38]	0.95***	[0.93,0.97]	1.01	[1.00,1.03]	- 0.037***	[-0.049,-0.025]
2006	1.06	[0.93,1.20]	1.25***	[1.14,1.39]	0.93***	[0.91,0.95]	1.00	[0.99,1.02]	- 0.047***	[-0.060,-0.035]
2007	1.02	[0.90,1.15]	1.24***	[1.12,1.37]	0.97*	[0.95,1.00]	1.07***	[1.05,1.09]	- 0.061***	[-0.073,-0.048]
2008	0.95	[0.84,1.08]	1.31***	[1.18,1.45]	0.97**	[0.95,0.99]	1.08***	[1.07,1.10]	- 0.068***	[-0.081,-0.055]
Constant	0.07***	[0.03,0.16]	0.68	[0.39,1.17]	2.52***	[2.17,2.92]	6.42***	[5.74,7.18]	0.18***	[0.10,0.25]
Average practice intercept	0.27***	[0.22,0.33]	0.35***	[0.32,0.39]	0.36***	[0.35,0.38]	0.29***	[0.28,0.30]	-2.62***	[-2.68,-2.55]
N	65218		65218		65218		65218		48096	

Notes : Logit models used for IP and ED visits. Zero-truncated Poisson with reintroduced zeros used for PCP and OP vists. Robust OLS used for Continuity of Care.
Continuity of Care models only for patients with >=3 OP visits during the year.
*p<0.05,**p<0.01,***p<0.001

Table 5.7b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models

	>=1 IP Admission	>=1 ED Visit	# PCP Visits	# OP Visits	Continuity of Care
CCNC					
MLM AME	- 0.0060 [-0.0146,0.0037]	- 0.001 [-0.015,0.013]	- 0.287** [-0.36,-0.21]	- 0.294** [-0.40,-0.19]	- 0.0071 [-0.0207,0.0065]
FE AME	- 0.000 [-0.013,0.013]	0.002 [-0.013,0.017]	- 0.181* [-0.342,-0.020]	- 0.243* [-0.460,-0.026]	- 0.0088 [-0.0237,0.0062]

Notes: For multi-level models: logit models used for IP and ED visits, zero-truncated Poisson with reintroduced zeros used for PCP and OP vists, robust OLS used for Continuity of Care. For fixed-effects models: Cluster-robust LPMs used for IP and ED visits, OLS used for PCP and OP visits and Contintinuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

Table 5.8a: Multi-Level Estimates of the Moderating Effect of CCNC Patient Load on Yearly Health Care Utilization

	>=1 IP Admission		>=1 ED Visit		# PCP Visits		# OP Visits		Continuity of Care	
	OR	95% CI	OR	95% CI	IRR	95% CI	IRR	95% CI	Coeff.	95% CI
CCNC Patients (omitted=Very Low)										
Low	0.87	[0.74,1.03]	1.02	[0.88,1.18]	0.97	[0.93,1.02]	0.95**	[0.92,0.99]	0.0257**	[0.0074,0.0440]
	(AME = -0.011)		(AME = 0.003)		(AME = -0.10)		(AME = -0.34)		(AME = 0.036)	
Medium	0.92	[0.78,1.09]	1.13	[0.96,1.31]	0.96	[0.91,1.02]	0.93***	[0.89,0.97]	0.041***	[0.021,0.060]
	(AME = -0.007)		(AME = 0.017)		(AME = -0.14)		(AME = -0.50)		(AME = 0.044)	
High	0.97	[0.80,1.16]	1.12	[0.95,1.33]	0.95	[0.90,1.01]	0.93**	[0.89,0.97]	0.042***	[0.022,0.063]
	(AME = -0.003)		(AME = 0.016)		(AME = -0.19)		(AME = -0.49)		(AME = 0.054)	
Very High	0.81*	[0.68,0.96]	1.21*	[1.03,1.42]	0.96	[0.90,1.02]	0.91***	[0.87,0.95]	0.051***	[0.031,0.071]
	(AME = -0.016)		(AME = 0.028)		(AME = -0.151)		(AME = -0.64)		(AME = 0.061)	
CCNC Early Adopter	1.08	[0.98,1.20]	1.11*	[1.01,1.23]	1.00	[0.95,1.05]	0.97	[0.93,1.01]	0.0107	[-0.0030,0.0245]
Person-level controls										
Age	0.99	[0.94,1.03]	0.95**	[0.92,0.98]	1.00	[0.99,1.01]	0.99***	[0.98,0.99]	0.0126***	[0.0085,0.0167]
Age^2	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00***	[1.00,1.00]	- 0.00014***	[-0.00019,-0.00010]
Male	0.93	[0.85,1.01]	0.74***	[0.69,0.79]	0.78***	[0.77,0.79]	0.75***	[0.74,0.75]	0.072***	[0.062,0.081]
Charlson Index	2.99***	[2.80,3.19]	1.79***	[1.69,1.88]	1.43***	[1.42,1.44]	1.46***	[1.45,1.47]	- 0.048***	[-0.055,-0.041]
Charlson Index^2	0.94***	[0.93,0.94]	0.96***	[0.96,0.97]	0.98***	[0.98,0.98]	0.98***	[0.98,0.98]	0.0027***	[0.0018,0.0350]
Eligibility (omitted = subscriber)										
Spouse	1.42***	[1.26,1.60]	0.95	[0.86,1.06]	1.11***	[1.09,1.13]	1.12***	[1.10,1.13]	- 0.027***	[-0.039,-0.014]
Other	0.87	[0.42,1.80]	0.71	[0.45,1.15]	0.83**	[0.73,0.93]	0.82***	[0.75,0.89]	0.011	[-0.064,0.086]
Plan Type (omitted = CMM)										
Smart Choice	0.77*	[0.63,0.95]	0.70***	[0.60,0.82]	0.96*	[0.93,0.99]	0.98	[0.96,1.00]	- 0.003	[-0.022,0.017]
Smart Choice Basic	0.80*	[0.65,0.99]	0.85	[0.72,1.00]	0.90***	[0.87,0.93]	0.89***	[0.86,0.91]	0.0251*	[0.0040,0.0463]
Smart Choice Plus	1.29*	[1.01,1.65]	1.01	[0.83,1.23]	1.10***	[1.06,1.15]	1.13***	[1.10,1.17]	- 0.0234	[-0.0487,0.0018]
Practice and county-level controls										
# Primary Care Providers	1.00	[1.00,1.01]	1.00	[0.99,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	- 0.00030	[-0.00112,0.00053]
Multisite Practice	0.70	[0.42,1.16]	0.88	[0.56,1.38]	1.15	[0.88,1.49]	1.18	[0.95,1.46]	- 0.003	[-0.092,0.086]
Rural-Urban										
Non-urban, Non-rural	1.07	[0.95,1.20]	1.12	[1.00,1.25]	0.98	[0.92,1.03]	0.92***	[0.88,0.97]	0.0203*	[0.0048,0.0357]
Rural	0.88	[0.68,1.14]	0.97	[0.77,1.21]	0.95	[0.85,1.06]	0.87**	[0.80,0.95]	0.054**	[0.021,0.087]
Community-based Practice	0.91	[0.77,1.08]	0.91	[0.76,1.09]	1.02	[0.92,1.14]	1.04	[0.96,1.13]	- 0.008	[-0.040,0.025]
County Proportion Poverty	0.52	[0.12,2.16]	0.22*	[0.06,0.84]	1.73*	[1.08,2.77]	1.06	[0.73,1.53]	- 0.03	[-0.20,0.15]
Primary Care Providers/10,000 Population	0.99	[0.98,1.00]	1.00	[0.99,1.01]	1.00	[0.99,1.00]	1.00	[0.99,1.00]	0.0003	[-0.0015,0.0020]
County Proportion Race/Ethnicity										
Non-white, not Hispanic	1.18	[0.80,1.74]	1.79**	[1.25,2.56]	0.99	[0.84,1.16]	0.93	[0.82,1.06]	0.025	[-0.024,0.074]
Hispanic	1.40	[0.69,2.84]	0.96	[0.49,1.85]	1.12	[0.82,1.53]	0.77*	[0.60,0.99]	0.070	[-0.025,0.155]
Year										
2005	1.26	[0.88,1.80]	1.27	[0.97,1.66]	0.89***	[0.84,0.94]	1.04	[1.00,1.08]	- 0.037***	[-0.057,-0.017]
2006	1.26	[0.88,1.80]	1.23	[0.94,1.60]	0.89***	[0.84,0.93]	1.05*	[1.01,1.09]	- 0.040***	[-0.059,-0.020]
2007	1.25	[0.88,1.78]	1.23	[0.94,1.60]	0.92***	[0.87,0.97]	1.10***	[1.06,1.15]	- 0.063***	[-0.082,-0.044]
2008	1.14	[0.80,1.62]	1.28	[0.98,1.67]	0.91***	[0.87,0.96]	1.12***	[1.07,1.16]	- 0.070***	[-0.090,-0.050]
Constant	0.04***	[0.01,0.14]	0.73	[0.32,1.64]	2.39***	[1.92,2.97]	5.99***	[5.06,7.09]	0.23***	[0.13,0.33]
Average practice intercept	0.19***	[0.12,0.29]	0.36***	[0.31,0.41]	0.31***	[0.29,0.33]	0.25***	[0.24,0.27]	-2.77***	[-2.87,-2.67]
N	30229		30229		30229		30229		25557	

Notes : Logit models used for IP and ED visits. Zero-truncated Poisson with reintroduced zeros used for PCP and OP vists. Robust OLS used for Continuity of Care.
Continuity of Care models restricted sample to patients with >=3 visits during the year.
*p<0.05,**p<0.01,***p<0.001

Table 5.8b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed-Effects Models

	>=1 IP Admission	>=1 ED Visit	# PCP Visits	# OP Visits	Continuity of Care
CCNC Patients (omitted=Very Low)					
Low					
MLM AME	- 0.011 [-0.0235,0.0015]	0.003 [-0.017,0.023]	- 0.100 [-0.278,0.078]	- 0.34** [-0.58,-0.10]	0.036** [0.017,0.055]
FE AME	- 0.007 [-0.039,0.026]	- 0.027 [-0.069,0.015]	0.03 [-0.23,0.29]	0.02 [-0.47,0.51]	0.025 [-0.011,0.061]
Medium					
MLM AME	- 0.007 [-0.0190,0.0050]	0.017 [-0.0030,0.0369]	- 0.140 [-0.321,0.041]	- 0.50** [-0.74,-0.26]	0.044** [0.026,0.062]
FE AME	0.029 [-0.012,0.069]	-0.013 [-0.065,0.040]	0.033 [-0.33,0.40]	0.051 [-0.55,0.65]	0.021 [-0.022,0.063]
High					
MLM AME	- 0.003 [-0.18,0.17]	0.016 [-0.012,0.044]	- 0.190 [-0.440,0.060]	- 0.49** [-0.83,-0.15]	0.054** [0.029,0.079]
FE AME	0.023 [-0.022,0.068]	- 0.022 [-0.080,0.036]	- 0.07 [-0.51,0.36]	0.09 [-0.59,0.76]	- 0.001 [-0.050,0.048]
Very High					
MLM AME	- 0.0160* [-0.0293,-0.0027]	0.0280* [0.0025,0.0535]	- 0.151 [-0.391,0.089]	- 0.64** [-0.96,-0.32]	0.061** [0.039,0.083]
FE AME	0.017 [-0.030,0.063]	- 0.024 [-0.086,0.037]	- 0.027 [-0.49,0.44]	0.00 [-0.75,0.76]	0.006 [-0.046,0.057]

Notes : For multi-level models: logit models used for IP and ED visits, zero-truncated Poisson with reintroduced zeros used for PCP and OP vists, robust OLS used for Continuity of Care. For fixed-effects models: Cluster-robust LPMs used for IP and ED visits, OLS used for PCP and OP visits and Contintinuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.9a: Multi-Level Estimates of the Effect of CCNC on SHP Paid Medical Expenditures

	Total		IP		ED		OP		RX	
	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI
CCNC	132.03	[-520.64,784.69]	-127.38	[-520.73,265.97]	10.07	[-42.02,62.15]	223.7	[-195.50,642.89]	-29.86	[-140.74,81.02]
	(AME = 132.03)		(AME = -127.38)		(AME = 10.07)		(AME = 223.70)		(AME = -29.86)	
Ever CCNC	-488.89	[-1200.80,223.01]	126.07	[-267.76,519.89]	7.15	[-46.26,60.56]	-540.85*	[-1048.04,-33.65]	-52.64	[-187.27,81.98]
CCNC Early Adopter	201.52	[-390.30,793.35]	97.05	[-183.57,377.67]	48.65*	[8.55,88.75]	145.35	[-328.20,618.90]	- 145.15*	[-271.24,-19.06]
Person-level controls										
Age	-12.96	[-165.59,139.68]	-98.98*	[-197.65,-0.30]	-0.02	[-12.76,12.73]	-31.16	[-125.31,62.99]	119.47***	[94.59,144.35]
Age^2	0.32	[-1.31,1.95]	1.14*	[0.08,2.19]	-0.09	[-0.22,0.05]	0.48	[-0.53,1.49]	-1.24***	[-1.50,-0.97]
Male	-243.08	[-529.52,43.35]	295.87**	[111.50,480.25]	-72.00***	[-95.84,-48.16]	-570.81***	[-747.98,-393.64]	113.19***	[66.37,160.01]
Charlson Index	5001.60***	[4751.30,5251.89]	2010.94***	[1849.26,2172.61]	301.82***	[280.93,322.70]	1954.06***	[1799.61,2108.50]	718.79***	[677.97,759.60]
Charlson Index^2	472.62***	[440.22,505.02]	160.82***	[139.85,181.79]	-10.35***	[-13.05,-7.64]	337.08***	[317.11,357.06]	-16.33***	[-21.61,-11.05]
Eligibility (omitted = subscriber)										
Spouse	2770.28***	[2330.51,3210.05]	651.44***	[367.67,935.21]	57.56**	[20.89,94.22]	1156.30***	[884.64,1427.96]	888.52***	[816.73,960.31]
Other	-930.96	[-3351.56,1489.64]	-897.75	[-2464.66,669.16]	33.05	[-169.16,235.26]	-1211.73	[-2704.70,281.25]	1274.93***	[880.40,1669.46]
Plan Type (omitted = CMM)										
Smart Choice	-1377.38***	[-2094.88,-659.88]	-1254.63***	[-1718.61,-790.65]	-87.11**	[-147.02,-27.21]	-89.55	[-532.14,353.03]	61.69	[-55.26,178.65]
Smart Choice Basic	-2560.16***	[-3301.43,-1818.88]	-1552.47***	[-2031.99,-1072.95]	-37.31	[-99.21,24.59]	-774.44***	[-1231.57,-317.30]	-176.43**	[-297.23,-55.63]
Smart Choice Plus	2572.89***	[1655.12,3490.65]	220.51	[-373.12,814.13]	81.66*	[5.02,158.30]	1638.46***	[1072.54,2204.38]	643.84***	[494.29,793.39]
Practice and county-level controls										
# Primary Care Providers	8.85	[-18.08,35.78]	11.62	[-0.21,23.46]	2.90**	[1.09,4.70]	7.44	[-12.08,26.96]	6.80*	[1.62,11.97]
Multisite Practice	-1250.52	[-3897.25,1396.20]	-712.39	[-1925.48,500.70]	-81.42	[-255.35,92.50]	-856.42	[-3068.11,1355.28]	280.9	[-308.67,870.47]
Rural-Urban										
Non-urban, Non-rural	283.63	[-251.03,818.29]	193.20	[-70.23,456.62]	42.03*	[4.85,79.22]	212.47	[-201.29,626.24]	`-53.24	[-163.30,56.82]
Rural	-576.83	[-1803.01,649.36]	-288.68	[-930.28,352.92]	-57.17	[-145.25,30.91]	102.02	[-833.97,1038.01]	-239.7	[-488.64,9.24]
Community-based Practice	-1778.73***	[-2599.30,-958.15]	-269.37	[-636.56,97.82]	20.75	[-33.26,74.76]	-1973.12***	[-2635.52,-1310.72]	-99.96	[-276.32,76.40]
County Proportion Poverty	-5895.36	[-12104.25,313.53]	1370.31	[-1727.18,4467.81]	-1140.75**	[-1577.86,-703.64]	-5803.26*	[-10451.03,-1155.49]	-608.81	[-1843.50,625.88]
Primary Care Providers/10,000 Population	-35.00	[-80.61,10.61]	-3.40	[-24.67,17.86]	-1.20	[-4.26,1.86]	-29.53	[-66.12,7.06]	-0.33	[-10.07,9.41]
County Proportion Race/Ethnicity										
Non-white, not Hispanic	-281.27	[-1950.27,1387.74]	-369.89	[-1206.40,466.62]	249.36***	[132.23,366.49]	416.44	[-863.17,1696.05]	-514.67**	[-854.94,-174.41]
Hispanic	-2568.05	[-5810.31,674.21]	-856.42	[-2475.39,762.55]	124.76	[-102.43,351.94]	-2014.39	[-4509.35,480.56]	-188.14	[-851.71,475.42]
Year										
2005	1169.59***	[533.90,1805.27]	36.13	[-365.50,437.75]	168.83***	[116.61,221.04]	575.82**	[174.31,977.32]	430.26***	[324.08,536.44]
2006	1534.86***	[904.32,2165.40]	113.9	[-283.03,510.83]	170.46***	[118.80,222.13]	731.29***	[331.92,1130.67]	540.45***	[434.83,646.08]
2007	1611.32***	[983.34,2239.29]	63.13	[-330.57,456.84]	181.79***	[130.48,233.10]	672.84***	[273.64,1072.04]	713.25***	[607.66,818.84]
2008	2020.44***	[1390.65,2650.23]	269.71	[-124.33,663.75]	235.60***	[184.21,286.98]	854.84***	[453.99,1255.70]	688.97***	[582.94,794.99]
Constant	3099.36	[-707.69,6906.41]	1881.67	[-517.90,4281.24]	96.21	[-215.82,408.25]	3621.95**	[1197.24,6046.65]	-2088.28***	[-2729.73,-1446.82]
Average practice intercept	7.78***	[7.65,7.90]	6.27***	[6.00,6.55]	4.71***	[4.55,4.88]	7.78***	[7.69,7.86]	6.46***	[6.39,6.53]
N	65218		65218		65218		65218		65218	

Notes : Bootstrapped OLS models used for all outcomes.
*p<0.05,**p<0.01,***p<0.001

Table 5.9b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models

	Total	IP	ED	OP	Rx
CCNC					
MLM AME	132.03 [-524.81,788.87]	- 127.38 [-523.25,268.49]	10.07 [-42.35,62.49]	223.70 [-198.18,645.58]	- 29.86 [-141.45,81.73]
FE AME	262.23 [-481.75,1006.20]	- 20.95 [-567.06,525.15]	46.04 [-0.42,92.50]	242.59 [-121.64,606.82]	- 5.20 [-116.09,105.70]

Notes: Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.10a: Multi-Level Estimates of the Moderating Effect of CCNC Patient Load on SHP Paid Medical Expenditures

	Total		IP		ED		OP		RX	
	Coeff.	95%	Coeff.	95%	Coeff.	95%	Coeff.	95%	Coeff.	95%
CCNC Patients (omitted=Very Low)										
Low	-1038.01*	[-1962.91,-113.12]	-36.69	[-578.42,505.04]	4.84	[-72.42,82.09]	-958.19**	[-1547.90,-368.48]	-88.68	[-257.50,80.14]
	(AME = -1038.01)		(AME = -36.69)		(AME = 4.84)		(AME = -958.19)		(AME = -88.68)	
Medium	-1265.29**	[-2223.35,-307.22]	190.34	[-370.88,751.56]	16.71	[-63.19,96.60]	-1215.17***	[-1827.34,-603.00]	-233.24*	[-411.33,-55.14]
	(AME = -1265.29)		(AME = 190.34)		(AME = 16.71)		(AME = -1215.17)		(AME = -233.24)	
High	-821.87	[-1860.00,216.27]	371.57	[-231.60,974.73]	31.3	[-55.08,117.68]	-1110.06**	[-1773.99,-446.13]	-115.56	[-308.28,77.16]
	(AME = -821.87)		(AME = 371.57)		(AME = 31.30)		(AME = -1110.06)		(AME = -115.56)	
Very High	-1856.86***	[-2825.48,-888.24]	-126.9	[-680.83,427.02]	29.1	[-50.99,109.20]	-1475.61***	[-2098.17,-853.05]	-338.01***	[-523.09,-152.92]
	(AME = -1856.86)		(AME = -126.90)		(AME = 29.10)		(AME = -1475.61)		(AME = -338.01)	
CCNC Early Adopter	284.01	[-284.49,852.52]	121.15	[-187.29,429.59]	47.96*	[1.83,94.09]	202.27	[-168.19,572.72]	`-128.96*	[-245.75,-12.17]
Person-level controls										
Age	-76.52	[-307.25,154.21]	-74.36	[-222.25,73.53]	1.62	[-18.37,21.62]	-96.83	[-239.66,46.00]	95.28***	[59.65,130.92]
Age^2	0.96	[-1.52,3.44]	0.75	[-0.84,2.34]	-0.11	[-0.33,0.10]	1.30	[-0.23,2.84]	-1.01***	[-1.39,-0.62]
Male	-286.02	[-727.92,155.89]	304.27*	[21.58,586.96]	-78.97***	[-117.23,-40.70]	-557.00***	[-830.72,-283.28]	45.74	[-22.71,114.19]
Charlson Index	5569.43***	[5194.28,5944.58]	2002.14***	[1761.74,2242.55]	320.34***	[287.83,352.85]	2518.55***	[2286.31,2750.79]	716.33***	[658.40,774.27]
Charlson Index^2	395.38***	[347.81,442.95]	168.01***	[137.49,198.53]	-8.56***	[-12.68,-4.43]	257.02***	[227.58,286.45]	`-19.38***	[-26.71,-12.05]
Eligibility (omitted = subscriber)										
Spouse	3240.09***	[2548.21,3931.97]	950.92***	[507.98,1393.85]	61.93*	[2.00,121.86]	1258.45***	[830.00,1686.91]	964.48***	[857.44,1071.51]
Other	-2766.94	[-6432.05,898.17]	-1680.12	[-4031.85,671.60]	27.13	[-290.61,344.87]	-1544.03	[-3812.33,724.28]	554.00	[-11.76,1119.76]
Plan Type (omitted = CMM)										
Smart Choice	-1235.26*	[-2433.84,-36.68]	-1388.76***	[-2157.16,-620.35]	-112.05*	[-215.93,-8.18]	273.75	[-468.20,1015.70]	-1.33	[-186.42,183.76]
Smart Choice Basic	-2356.70***	[-3583.16,-1130.23]	-1749.52***	[-2535.93,-963.11]	-57.60	[-163.90,48.70]	-329.64	[-1088.80,429.52]	-215.23*	[-404.57,-25.90]
Smart Choice Plus	3293.25***	[1798.39,4788.10]	348.24	[-609.87,1306.35]	157.80*	[28.25,287.34]	2303.79***	[1378.42,3229.15]	478.50***	[247.67,709.32]
Practice and county-level controls										
# Primary Care Providers	48.78**	[18.91,78.64]	20.98**	[6.10,35.86]	1.60	[-0.79,3.98]	26.32**	[6.84,45.80]	13.39***	[7.64,19.15]
Multisite Practice	-1245.26	[-3810.14,1319.63]	-711.33	[-2112.32,689.66]	-60.88	[-268.45,146.68]	-703.81	[-2383.97,976.35]	272.78	[-279.00,824.57]
Rural-Urban										
Non-urban, Non-rural	-179.18	[-852.81,494.44]	250.67	[-115.34,616.68]	-10.08	[-64.82,44.66]	-274.01	[-712.33,164.30]	-31.67	[-168.69,105.35]
Rural	-711.06	[-2049.00,626.88]	-292.43	[-1062.88,478.03]	-65.15	[-175.93,45.64]	-13.48	[-873.92,846.96]	-237.18	[-498.15,23.80]
Community-based Practice	66.27	[-973.45,1106.00]	-154.03	[-677.05,368.99]	10.42	[-72.04,92.88]	112.53	[-575.12,800.18]	197.33	[-30.52,425.18]
County Proportion Poverty	-5055.13	[-13121.37,3011.10]	205.28	[-4238.45,4649.01]	-1259.83***	[-1919.67,-599.99]	-4829.64	[-10047.75,388.48]	-648.65	[-2225.59,928.29]
Primary Care Providers/10,000 Population	-54.73	[-116.14,6.69]	-7.37	[-40.34,25.60]	-2.40	[-7.36,2.56]	-43.84*	[-84.01,-3.67]	-9.25	[-22.12,3.62]
County Proportion Race/Ethnicity										
Non-white, not Hispanic	-119.72	[-2278.72,2039.29]	-216.24	[-1422.28,989.81]	378.11***	[201.13,555.09]	722.44	[-674.46,2119.34]	-735.87***	[-1163.95,-307.79]
Hispanic	-949.02	[-4902.78,3004.73]	-424.65	[-2618.31,1769.01]	269.22	[-54.27,592.71]	-163.73	[-2724.71,2397.25]	-682.31	[-1471.14,106.53]
Year										
2005	1281.82	[-512.08,3075.71]	496.21	[-643.47,1635.90]	159.71*	[4.69,314.73]	363	[-749.63,1475.64]	352.22*	[72.56,631.88]
2006	1396.91	[-376.35,3170.17]	465.28	[-661.69,1592.25]	151.37	[-1.87,304.62]	373.06	[-726.69,1472.81]	475.42***	[199.11,751.72]
2007	1696.99	[-66.06,3460.04]	526.82	[-593.59,1647.23]	177.40*	[25.05,329.75]	402.41	[-691.14,1495.96]	636.98***	[362.07,911.89]
2008	2043.98*	[283.77,3804.20]	636.5	[-481.91,1754.90]	244.37**	[92.28,396.46]	609.26	[-482.61,1701.14]	616.72***	[342.08,891.36]
Constant	2591.18	[-3292.77,8475.13]	1175.08	[-2547.60,4897.75]	82.02	[-425.11,589.15]	2567.89	[-1091.46,6227.24]	-1316.72**	[-2254.37,-379.08]
Average practice intercept	7.36***	[7.17,7.55]	6.00***	[5.42,6.58]	4.66***	[4.36,4.96]	7.04***	[6.86,7.22]	6.20***	[6.08,6.31]
N	30229		30229		30229		30229		30229	

Notes : Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.10b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed-Effects Models

	Total	IP	ED	OP	Rx
CCNC Patients (omitted=Very Low)					
Low					
MLM AME	- 1038.01* [-1958.77,-117.25]	- 36.69 [-576.00,502.62]	4.84 [-72.07,81.75]	- 958.19** [-1545.26,-371.12]	- 88.68 [-256.75,79.39]
FE AME	1614.77 [-158.95,3388.50]	998.72 [-166.80,2164.24]	- 129.28 [-356.16,97.59]	512.13 [-392.28,1416.54]	232.94 [-72.19,538.07]
Medium					
MLM AME	- 1265.29** [-2122.56,-408.02]	190.35 [-311.82,692.52]	16.71 [-54.78,88.20]	- 1215.17** [-1762.94,-667.40]	- 233.24** [-392.60,-73.88]
FE AME	1796.15 [-266.57,3858.88]	1656.07* [339.94,2972.20]	- 124.58 [-371.11,121.95]	29.16 [-1171.66,1229.99]	235.27 [-93.21,563.76]
High					
MLM AME	- 821.87 [-2016.55,372.81]	371.57 [-322.54,1065.68]	31.3 [-68.11,130.71]	- 1110.06** [-1874.10,-346.02]	- 115.56 [-337.34,106.22]
FE AME	2385.58 [-356.20,5127.36]	1801.00 [-136.48,3738.47]	- 137.26 [-416.40,141.88]	476.50 [-937.47,1890.46]	245.34 [-131.19,621.88]
Very High					
MLM AME	- 1856.86** [-2889.98,-823.74]	- 126.9 [-717.71,463.91]	29.1 [-56.35,114.55]	- 1475.61** [-2139.63,-811.59]	- 338.01** [-535.42,-140.60]
FE AME	3180.85* [244.01,6117.69]	2167.17* [221.09,4113.25]	- 156.07 [-446.97,134.82]	1068.65 [-642.73,2780.04]	99.80 [-287.99,487.60]

Notes : Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.11a: Multi-Level Odds Ratios of the Effect of CCNC on Receipt of Yearly Diabetes Measures, by Practice Size

	>=1 A1C						>=1 LDL					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC	1.56*	[1.11,2.20]	1.19	[0.98,1.45]	1.1	[0.93,1.31]	1.21	[0.88,1.66]	1.08	[0.91,1.29]	1.03	[0.90,1.18]
	(AME = 0.0616)		(AME = 0.0232)		(AME = 0.011)		(AME = 0.030)		(AME = 0.013)		(AME = 0.005)	
Ever CCNC	1.01	[0.60,1.69]	0.98	[0.74,1.30]	0.73	[0.50,1.08]	1.4	[0.85,2.29]	1.18	[0.91,1.54]	0.83	[0.59,1.16]
CCNC Early Adopter	1.00	[1.00,1.00]	1.03	[0.95,1.12]	1.00	[0.99,1.01]	1.00	[1.00,1.00]	0.95	[0.88,1.02]	1.00	[0.99,1.00]
Person-level controls												
Age	1.05	[0.97,1.12]	1.07**	[1.03,1.12]	1.02	[0.99,1.06]	1.11**	[1.04,1.18]	1.12***	[1.08,1.17]	1.10***	[1.07,1.13]
Age^2	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]
Male	1.28***	[1.12,1.47]	1.19***	[1.10,1.30]	1.12***	[1.05,1.20]	1.21**	[1.07,1.38]	1.11**	[1.03,1.20]	1.13***	[1.07,1.20]
Charlson Index	3.80***	[3.34,4.32]	4.66***	[4.28,5.07]	4.78***	[4.47,5.12]	1.52***	[1.36,1.69]	1.60***	[1.49,1.71]	1.52***	[1.44,1.60]
Charlson Index^2	0.88***	[0.87,0.90]	0.85***	[0.85,0.86]	0.86***	[0.85,0.86]	0.96***	[0.95,0.97]	0.95***	[0.94,0.96]	0.95***	[0.94,0.96]
Eligibility (omitted = subscriber)												
Spouse	0.95	[0.77,1.16]	0.81**	[0.71,0.92]	0.79***	[0.72,0.87]	0.96	[0.79,1.16]	0.82**	[0.73,0.93]	0.85***	[0.78,0.93]
Other	1.28	[0.34,4.80]	4.12***	[1.79,9.45]	0.94	[0.60,1.47]	0.87	[0.25,3.00]	1.34	[0.67,2.65]	1.24	[0.83,1.85]
Plan Type (omitted = CMM)												
Smart Choice	1.58**	[1.16,2.15]	1.15	[0.93,1.42]	1.25**	[1.06,1.47]	1.45*	[1.09,1.92]	1.17	[0.97,1.41]	1.34***	[1.17,1.54]
Smart Choice Basic	1.62**	[1.18,2.24]	1.10	[0.89,1.37]	1.15	[0.97,1.37]	1.35*	[1.00,1.81]	1.11	[0.92,1.34]	1.25**	[1.09,1.44]
Smart Choice Plus	1.42	[0.94,2.13]	1.26	[0.96,1.67]	1.21	[0.98,1.50]	1.38	[0.95,2.01]	1.25	[0.98,1.59]	1.34**	[1.12,1.60]
	0.51**	[0.33,0.80]	0.77	[0.58,1.01]	0.65*	[0.45,0.94]	0.63*	[0.41,0.96]	0.76*	[0.59,0.98]	0.66*	[0.48,0.90]
Practice and county-level controls												
# Primary Care Providers	—	—	0.95	[0.26,3.45]	1.29	[0.19,8.70]	—	—	1.22	[0.36,4.19]	1.25	[0.23,6.70]
Multisite Practice	0.72	[0.52,1.00]	0.71**	[0.56,0.91]	0.64*	[0.45,0.92]	0.64**	[0.47,0.87]	0.86	[0.69,1.07]	0.73	[0.53,1.01]
Rural-Urban												
Non-urban, Non-rural	0.37*	[0.17,0.79]	0.7	[0.41,1.18]	0.33**	[0.16,0.71]	0.31**	[0.15,0.65]	0.54*	[0.33,0.89]	0.33***	[0.17,0.63]
Rural	1.30	[0.64,2.63]	1.67*	[1.08,2.59]	1.41	[0.92,2.17]	1.05	[0.54,2.05]	1.75**	[1.16,2.65]	1.43	[0.99,2.08]
Community-based Practice	0.92	[0.02,39.50]	1.05	[0.08,14.25]	25.42*	[1.60,402.94]	0.96	[0.03,34.16]	0.02***	[0.00,0.18]	0.59	[0.05,6.57]
County Proportion Poverty	1.01	[0.97,1.04]	1.01	[0.98,1.03]	0.93***	[0.90,0.95]	0.99	[0.96,1.03]	0.99	[0.97,1.01]	0.93***	[0.91,0.95]
Primary Care Providers/10,000 Population												
County Proportion Race/Ethnicity	0.80	[0.28,2.31]	0.66	[0.31,1.44]	0.59	[0.23,1.47]	0.57	[0.21,1.56]	0.90	[0.44,1.85]	1.01	[0.45,2.24]
Non-white, not Hispanic	6.39	[0.87,47.14]	5.07*	[1.21,21.26]	0.99	[0.12,8.02]	21.49**	[3.20,144.23]	4.24*	[1.11,16.25]	0.75	[0.12,4.61]
Hispanic												
Year												
2005	0.97	[0.72,1.32]	0.97	[0.79,1.20]	0.84	[0.71,1.00]	1.44**	[1.10,1.89]	1.38***	[1.15,1.67]	1.61***	[1.41,1.85]
2006	0.82	[0.61,1.10]	1.02	[0.83,1.26]	0.74***	[0.62,0.88]	1.50**	[1.15,1.97]	1.44***	[1.20,1.74]	1.67***	[1.45,1.92]
2007	1.01	[0.75,1.36]	1.15	[0.93,1.41]	0.78**	[0.65,0.94]	1.86***	[1.43,2.43]	1.74***	[1.44,2.09]	1.86***	[1.61,2.15]
2008	1.01	[0.74,1.36]	1.14	[0.92,1.41]	0.76**	[0.64,0.91]	2.02***	[1.53,2.66]	1.76***	[1.46,2.13]	1.92***	[1.66,2.21]
Constant	0.11*	[0.02,0.72]	0.06***	[0.02,0.18]	0.67	[0.24,1.89]	0.03***	[0.00,0.16]	0.04***	[0.01,0.11]	0.08***	[0.03,0.21]
Average practice intercept	1.31***	[1.18,1.46]	1.28***	[1.19,1.37]	1.31***	[1.21,1.43]	1.25***	[1.13,1.38]	1.22***	[1.13,1.30]	1.16***	[1.07,1.27]
N	7850		20393		35070		7850		20393		35070	

Notes : A1c is hemoglobin A1c test, LDL is low-density lipoprotein test.PCP is primary care provider. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.11a: Continued

	>=1 Eye Exam						Attention for Nephropathy					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC	0.90	[0.69,1.18]	1.12	[0.97,1.29]	0.98	[0.87,1.11]	0.96	[0.69,1.32]	1.07	[0.90,1.27]	1.04	[0.90,1.20]
	(AME = -0.022)		(AME = 0.0239)		(AME = -0.003)		(AME = -0.007)		(AME = 0.01)		(AME = 0.005)	
Ever CCNC	0.82	[0.64,1.04]	0.96	[0.85,1.08]	0.94	[0.84,1.04]	0.79	[0.54,1.14]	0.94	[0.79,1.12]	0.96	[0.82,1.12]
CCNC Early Adopter	1.00	[1.00,1.00]	1.05*	[1.00,1.11]	1.00	[0.99,1.00]	1.00	[1.00,1.00]	0.99	[0.93,1.06]	1.00	[0.99,1.00]
Person-level controls												
Age	0.97	[0.92,1.03]	0.98	[0.94,1.01]	0.97**	[0.94,0.99]	1.16***	[1.09,1.24]	1.06**	[1.01,1.10]	1.10***	[1.07,1.13]
Age^2	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	1.00	[1.00,1.00]	1.00***	[1.00,1.00]
Male	0.75***	[0.68,0.84]	0.84***	[0.79,0.90]	0.84***	[0.81,0.89]	0.92	[0.81,1.04]	0.97	[0.90,1.05]	1.02	[0.96,1.08]
Charlson Index	1.70***	[1.55,1.87]	1.70***	[1.60,1.81]	1.72***	[1.64,1.79]	1.96***	[1.74,2.19]	2.04***	[1.89,2.20]	2.00***	[1.89,2.12]
Charlson Index^2	0.95***	[0.94,0.96]	0.95***	[0.94,0.96]	0.95***	[0.95,0.96]	0.95***	[0.93,0.96]	0.95***	[0.94,0.95]	0.94***	[0.94,0.95]
Eligibility (omitted = subscriber)												
Spouse	0.91	[0.78,1.07]	0.99	[0.90,1.09]	0.95	[0.88,1.02]	0.94	[0.77,1.14]	0.94	[0.83,1.06]	0.95	[0.87,1.04]
Other	1.37	[0.46,4.10]	0.79	[0.41,1.51]	0.91	[0.62,1.33]	0.78	[0.25,2.41]	1.20	[0.63,2.30]	1.10	[0.76,1.61]
Plan Type (omitted = CMM)												
Smart Choice	1.33*	[1.02,1.72]	1.43***	[1.20,1.70]	1.30***	[1.15,1.48]	1.16	[0.86,1.57]	1.18	[0.97,1.44]	1.28***	[1.11,1.48]
Smart Choice Basic	0.96	[0.74,1.26]	1.03	[0.86,1.23]	1.05	[0.93,1.20]	1.22	[0.89,1.67]	1.04	[0.85,1.27]	1.23**	[1.06,1.43]
Smart Choice Plus	1.50*	[1.08,2.08]	1.36**	[1.09,1.69]	1.28**	[1.10,1.49]	1.37	[0.91,2.05]	1.29	[0.99,1.68]	1.39***	[1.15,1.67]
	0.97	[0.74,1.27]	0.89	[0.77,1.03]	1.05	[0.91,1.20]	0.97	[0.68,1.40]	1.06	[0.87,1.29]	0.86	[0.72,1.03]
Practice and county-level controls												
# Primary Care Providers	—	—	1.02	[0.64,1.63]	1.16	[0.72,1.86]	—	—	0.60	[0.29,1.23]	0.77	[0.38,1.58]
Multisite Practice	1.05	[0.89,1.23]	0.97	[0.88,1.08]	0.89*	[0.80,0.99]	0.85	[0.66,1.08]	0.90	[0.77,1.04]	0.87	[0.74,1.02]
Rural-Urban												
Non-urban, Non-rural	0.78	[0.50,1.21]	0.83	[0.66,1.06]	0.76*	[0.59,0.97]	0.8	[0.44,1.44]	1.06	[0.76,1.47]	0.79	[0.57,1.11]
Rural	1.16	[0.80,1.67]	1.1	[0.92,1.32]	0.96	[0.85,1.09]	0.74	[0.41,1.34]	1.13	[0.86,1.50]	1.06	[0.88,1.27]
Community-based Practice	0.59	[0.08,4.41]	0.81	[0.23,2.76]	0.45	[0.14,1.50]	0.45	[0.02,9.07]	0.05***	[0.01,0.29]	0.20	[0.04,1.09]
County Proportion Poverty	1.02*	[1.00,1.04]	1.02**	[1.01,1.03]	1.01***	[1.01,1.02]	1.00	[0.97,1.03]	1.00	[0.99,1.02]	0.97***	[0.96,0.98]
Primary Care Providers/10,000 Population												
County Proportion Race/Ethnicity	0.68	[0.39,1.16]	0.81	[0.58,1.14]	0.71*	[0.53,0.97]	2.76*	[1.22,6.26]	2.31**	[1.40,3.80]	2.08***	[1.35,3.21]
Non-white, not Hispanic	0.43	[0.16,1.14]	0.92	[0.50,1.71]	0.51	[0.26,1.00]	3.72	[0.82,16.76]	2.22	[0.90,5.50]	1.91	[0.71,5.10]
Hispanic												
Year												
2005	0.88	[0.70,1.10]	0.90	[0.77,1.05]	0.92	[0.83,1.03]	1.33*	[1.02,1.73]	1.51***	[1.26,1.81]	1.49***	[1.31,1.70]
2006	0.86	[0.69,1.07]	0.94	[0.81,1.10]	1.00	[0.90,1.12]	1.40*	[1.07,1.82]	1.39***	[1.16,1.66]	1.49***	[1.30,1.70]
2007	1.48***	[1.20,1.83]	1.46***	[1.25,1.69]	1.46***	[1.31,1.62]	1.62***	[1.25,2.10]	1.52***	[1.28,1.82]	1.55***	[1.36,1.77]
2008	1.60***	[1.29,1.99]	1.67***	[1.43,1.94]	1.58***	[1.42,1.76]	1.66***	[1.27,2.17]	1.48***	[1.24,1.77]	1.53***	[1.34,1.74]
Constant	0.21*	[0.05,0.90]	0.18***	[0.07,0.43]	0.38**	[0.20,0.72]	0.03***	[0.01,0.15]	0.23**	[0.08,0.63]	0.11***	[0.05,0.23]
Average practice intercept	0.38***	[0.31,0.48]	0.32***	[0.27,0.37]	0.26***	[0.23,0.31]	0.81**	[0.70,0.92]	0.62***	[0.56,0.68]	0.44***	[0.39,0.49]
N	7850		20393		35070		7850		20393		35070	

Notes: A1c is hemoglobin A1c test, LDL is low-density lipoprotein test.PCP is primary care provider. Logit models used for all outcomes.
*p<0.05,**p<0.01,***p<0.001

Table 5.11b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models, by Practice Size

	>=1 A1C			>=1 LDL		
	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)
CCNC						
MLM AME	0.0616**	0.0232	0.011	0.030	0.013	0.005
	[0.017,0.106]	[-0.0021,0.0485]	[-0.0087,0.0315]	[-0.019,0.079]	[-0.016,0.042]	[-0.017,0.027]
FE AME	0.0749*	0.0280	0.005	0.040	0.019	0.005
	[0.0068,0.1429]	[-0.0045,0.0605]	[-0.031,0.042]	[-0.026,0.107]	[-0.021,0.058]	[-0.032,0.043]

Notes: Logit models used for mult-level models. Cluster robust linear probability models used for fixed-effects models.

*p<0.05,**p<0.01,***p<0.001

Table 5.11b: Contintued

	>=1 Eye Exam			Attention for Nephropathy		
	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)
CCNC						
MLM AME	- 0.022	0.0239	- 0.003	- 0.007	0.010	0.005
	[-0.077,0.033]	[-0.0066,0.0543]	[-0.029,0.023]	[-0.055,0.041]	[-0.015,0.035]	[-0.015,0.025]
FE AME	- 0.036	0.0247	- 0.008	0.018	- 0.001	0.011
	[-0.091,0.019]	[-0.0054,0.0548]	[-0.038,0.021]	[-0.033,0.068]	[-0.032,0.029]	[-0.016,0.039]

Notes: Logit models used for mult-level models. Cluster robust linear probability models used for fixed-effects models.

*p<0.05,**p<0.01,***p<0.001

Table 5.12a: Multi-Level Odds Ratios of the Moderating Effect of CCNC Patient Load on Receipt of Yearly Diabetes Measures, by Practice Size

	>=1 A1C						>=1 LDL					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC Patients (omitted = Very Low)												
Low	1.60	[0.99,2.60]	1.09	[0.73,1.62]	0.75	[0.47,1.19]	1.30	[0.85,1.98]	1.02	[0.72,1.45]	0.93	[0.66,1.33]
	(AME = 0.0736)		(AME = 0.0116)		(AME = -0.0313)		(AME = 0.0456)		(AME = 0.0032)		(AME =–0.01)	
Medium	1.57	[0.80,3.07]	0.95	[0.62,1.44]	0.61	[0.36,1.03]	1.34	[0.74,2.44]	0.95	[0.65,1.39]	0.88	[0.58,1.34]
	(AME = 0.0707)		(AME = -0.0076)		(AME = -0.0551)		(AME = 0.0513)		(AME = -0.0083)		(AME = -0.0185)	
High	0.68	[0.24,1.94]	0.96	[0.60,1.55]	0.47**	[0.27,0.81]	0.88	[0.36,2.14]	0.87	[0.56,1.33]	0.72	[0.47,1.12]
	(AME = -0.0654)		(AME =-0.0056)		(AME = -0.0888)		(AME =-0.0239)		(AME =-0.0241)		(AME =-0.0501)	
Very High	0.52	[0.17,1.53]	1.20	[0.73,1.96]	0.58*	[0.34,1.00]	1.32	[0.51,3.39]	0.85	[0.54,1.33]	0.65	[0.42,1.00]
	(AME = -0.1155)		(AME = 0.0244)		(AME = -0.0616)		(AME = 0.0482)		(AME =-0.0279)		(AME = -0.0686)	
CCNC Early Adopter	1.16	[0.68,1.98]	0.90	[0.66,1.23]	0.75	[0.47,1.19]	1.86**	[1.18,2.95]	1.12	[0.84,1.49]	0.87	[0.58,1.31]
Person-level controls												
Age	0.93	[0.82,1.05]	1.07*	[1.00,1.14]	0.99	[0.94,1.03]	1.01	[0.90,1.14]	1.10***	[1.04,1.17]	1.08***	[1.04,1.12]
Age^2	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00*	[1.00,1.00]
Male	1.20	[0.94,1.53]	1.19**	[1.05,1.35]	1.16**	[1.06,1.27]	1.15	[0.92,1.45]	1.20**	[1.07,1.34]	1.05	[0.97,1.13]
Charlson Index	3.94***	[3.11,4.98]	5.44***	[4.78,6.20]	4.54***	[4.15,4.96]	1.46***	[1.20,1.78]	1.76***	[1.58,1.95]	1.49***	[1.39,1.60]
Charlson Index^2	0.88***	[0.86,0.91]	0.83***	[0.82,0.85]	0.86***	[0.85,0.87]	0.96***	[0.94,0.98]	0.94***	[0.92,0.95]	0.95***	[0.95,0.96]
Eligibility (omitted = subscriber)												
Spouse	0.60**	[0.41,0.87]	0.80*	[0.65,0.98]	0.79**	[0.69,0.91]	0.77	[0.53,1.11]	0.75**	[0.63,0.90]	0.88*	[0.78,0.99]
Other	0.00	[0.00,0.00]	4.32*	[1.22,15.34]	0.51*	[0.28,0.95]	1.38	[0.06,33.13]	1.12	[0.40,3.16]	0.77	[0.43,1.38]
Plan Type (omitted = CMM)												
Smart Choice	1.47	[0.79,2.75]	1.09	[0.78,1.54]	1.09	[0.85,1.40]	1.57	[0.88,2.81]	1.07	[0.78,1.45]	1.46***	[1.19,1.79]
Smart Choice Basic	1.13	[0.60,2.13]	1.03	[0.73,1.46]	1.04	[0.80,1.34]	1.42	[0.79,2.56]	1.00	[0.74,1.37]	1.41**	[1.14,1.74]
Smart Choice Plus	1.02	[0.45,2.29]	1.28	[0.82,1.98]	1.08	[0.80,1.46]	2.05	[0.95,4.44]	1.02	[0.69,1.50]	1.27	[0.99,1.64]
Practice and county-level controls												
# Primary Care Providers	—	—	1.07	[0.94,1.22]	1.00	[0.99,1.01]	—	—	0.99	[0.88,1.11]	0.99*	[0.99,1.00]
Multisite Practice	—	—	1.18	[0.24,5.70]	1.07	[0.11,10.28]	—	—	1.47	[0.34,6.49]	1.06	[0.14,7.87]
Rural-Urban												
Non-urban, Non-rural	0.68	[0.35,1.29]	0.78	[0.55,1.10]	0.77	[0.46,1.31]	1.05	[0.60,1.84]	0.85	[0.62,1.17]	0.74	[0.46,1.19]
Rural	1.06	[0.34,3.30]	1.04	[0.52,2.07]	0.40	[0.15,1.06]	1.17	[0.43,3.21]	0.61	[0.33,1.15]	0.24**	[0.10,0.56]
Community-based Practice	1.27	[0.32,4.96]	0.80	[0.37,1.74]	0.79	[0.39,1.57]	2.74	[0.84,8.94]	1.31	[0.64,2.69]	0.99	[0.54,1.83]
County Proportion Poverty	0.47	[0.00,544.07]	3.37	[0.07,157.46]	33.44	[0.81,1377.97]	0.00*	[0.00,0.78]	0.03	[0.00,1.15]	0.57	[0.02,15.33]
Primary Care Providers/10,000 Population	1.05	[0.96,1.14]	0.97	[0.93,1.02]	0.92***	[0.88,0.95]	0.97	[0.90,1.05]	0.95*	[0.91,0.99]	0.91***	[0.88,0.94]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	1.19	[0.13,10.66]	0.67	[0.22,2.07]	0.48	[0.13,1.76]	1.15	[0.17,7.74]	1.04	[0.37,2.90]	0.71	[0.23,2.25]
Hispanic	49.34*	[1.38,1768.99]	3.72	[0.51,27.03]	0.31	[0.02,5.77]	272.95***	[11.60,6420.27]	6.06	[0.97,38.03]	0.31	[0.02,4.04]
Year												
2005	3.50	[0.39,31.67]	1.37	[0.61,3.09]	0.77	[0.53,1.12]	3.64	[0.46,28.68]	1.69	[0.78,3.64]	1.77***	[1.36,2.32]
2006	3.40	[0.38,30.46]	1.28	[0.57,2.88]	0.71	[0.49,1.03]	3.14	[0.40,24.50]	1.53	[0.71,3.28]	1.89***	[1.45,2.47]
2007	4.30	[0.48,38.48]	1.49	[0.66,3.36]	0.75	[0.52,1.09]	4.38	[0.56,34.12]	1.99	[0.92,4.28]	2.14***	[1.63,2.81]
2008	3.84	[0.43,34.49]	1.46	[0.65,3.29]	0.72	[0.49,1.04]	4.88	[0.63,38.04]	1.89	[0.88,4.07]	2.12***	[1.62,2.78]
Constant	0.15	[0.00,8.27]	0.08*	[0.01,0.59]	4.50	[0.96,21.05]	0.03	[0.00,1.36]	0.06**	[0.01,0.38]	0.21*	[0.06,0.78]
Average practice intercept	1.19	[0.97,1.46]	1.31***	[1.18,1.46]	1.54***	[1.38,1.72]	0.97	[0.79,1.20]	1.24***	[1.12,1.37]	1.37***	[1.22,1.53]
N	2139		9054		18500		2139		9054		18500	

Notes: A1c is hemoglobin A1c test, LDL is low-density lipoprotein test.PCP is primary care provider. Logit models used for all outcomes.
*p<0.05,**p<0.01,***p<0.001

Table 5.12a: Continued

	>=1 Eye Exam						Attention for Nephropathy					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC Patients (omitted = Very Low)												
Low	0.90	[0.72,1.12]	0.89	[0.74,1.08]	1.01	[0.84,1.23]	0.83	[0.57,1.20]	0.91	[0.68,1.21]	0.66**	[0.50,0.88]
	(AME = -0.0222)		(AME = -0.0247)		(AME = 0.003)		(AME = -0.0304)		(AME = -0.0134)		(AME = -0.0555)	
Medium	0.94	[0.68,1.29]	0.86	[0.71,1.04]	0.98	[0.80,1.20]	0.95	[0.56,1.63]	0.92	[0.68,1.25]	0.79	[0.58,1.07]
	(AME = - 0.0138)		(AME = -0.0339)		(AME =-0.0055)		(AME = -0.0073)		(AME = -0.0109)		(AME = -0.0307)	
High	0.57*	[0.34,0.96]	0.80	[0.64,1.00]	0.99	[0.81,1.22]	0.90	[0.38,2.13]	0.93	[0.66,1.32]	0.69*	[0.51,0.94]
	(AME =-0.1063)		(AME =-0.0484)		(AME =-0.0023)		(AME = -0.0162)		(AME = -0.0100)		(AME = -0.0493)	
Very High	0.53*	[0.30,0.95]	0.80*	[0.64,0.99]	0.88	[0.73,1.07]	5.14*	[1.48,17.85]	0.95	[0.67,1.33]	0.67**	[0.50,0.90]
	(AME = -0.1173)		(AME = -0.0489)		(AME = -0.0278)		(AME = 0.1597)		(AME = -0.0077)		(AME =-0.0539)	
CCNC Early Adopter	0.80*	[0.65,0.98]	0.95	[0.84,1.07]	0.96	[0.87,1.07]	0.89	[0.60,1.30]	0.9	[0.74,1.09]	1.02	[0.86,1.21]
Person-level controls												
Age	0.92	[0.83,1.02]	0.99	[0.94,1.04]	0.97	[0.93,1.00]	1.22**	[1.08,1.37]	1.05	[0.99,1.12]	1.10***	[1.06,1.15]
Age^2	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00**	[1.00,1.00]	1.00**	[1.00,1.00]	1.00	[1.00,1.00]	1.00***	[1.00,1.00]
Male	0.77**	[0.63,0.94]	0.83***	[0.75,0.91]	0.82***	[0.77,0.88]	0.91	[0.72,1.16]	0.98	[0.87,1.10]	1.06	[0.98,1.15]
Charlson Index	1.66***	[1.39,1.99]	1.67***	[1.52,1.82]	1.70***	[1.60,1.80]	2.07***	[1.67,2.56]	2.13***	[1.90,2.39]	2.06***	[1.92,2.22]
Charlson Index^2	0.96***	[0.93,0.98]	0.95***	[0.94,0.97]	0.95***	[0.95,0.96]	0.93***	[0.91,0.96]	0.94***	[0.92,0.96]	0.94***	[0.93,0.95]
Eligibility (omitted = subscriber)												
Spouse	0.89	[0.65,1.22]	0.85*	[0.73,0.99]	0.96	[0.87,1.06]	0.88	[0.61,1.29]	0.88	[0.73,1.07]	0.96	[0.85,1.10]
Other	6.58	[0.48,90.61]	0.78	[0.30,2.05]	0.99	[0.59,1.65]	0.25	[0.01,4.98]	1.10	[0.42,2.88]	0.93	[0.56,1.55]
Plan Type (omitted = CMM)												
Smart Choice	1.77	[0.97,3.24]	1.32*	[1.00,1.73]	1.36***	[1.13,1.63]	1.14	[0.60,2.16]	1.16	[0.83,1.61]	1.36**	[1.10,1.67]
Smart Choice Basic	1.45	[0.79,2.69]	0.93	[0.70,1.23]	1.09	[0.91,1.32]	1.19	[0.62,2.29]	0.95	[0.68,1.33]	1.28*	[1.03,1.58]
Smart Choice Plus	2.67**	[1.28,5.53]	1.27	[0.90,1.79]	1.33*	[1.06,1.65]	0.84	[0.37,1.90]	1.11	[0.73,1.70]	1.39*	[1.07,1.81]
Practice and county-level controls												
# Primary Care Providers	—	—	1.06	[0.98,1.15]	1.00	[0.99,1.00]	—	—	1.02	[0.92,1.13]	1.00	[0.99,1.01]
Multisite Practice	—	—	1.12	[0.66,1.88]	1.19	[0.73,1.94]	—	—	0.93	[0.38,2.24]	0.88	[0.40,1.93]
Rural-Urban												
Non-urban, Non-rural	0.76*	[0.59,0.99]	0.86*	[0.75,0.99]	0.81**	[0.71,0.92]	0.91	[0.57,1.46]	0.85	[0.68,1.05]	0.91	[0.74,1.12]
Rural	0.61	[0.36,1.04]	0.85	[0.64,1.11]	0.66**	[0.50,0.86]	1.10	[0.47,2.55]	1.02	[0.67,1.55]	0.74	[0.50,1.10]
Community-based Practice	1.25	[0.56,2.83]	1.19	[0.88,1.59]	0.98	[0.84,1.15]	0.14	[0.02,1.25]	0.64	[0.39,1.06]	0.84	[0.65,1.09]
County Proportion Poverty	11.16	[0.45,278.71]	2.00	[0.34,11.90]	2.43	[0.55,10.76]	0.04	[0.00,11.39]	0.14	[0.01,2.18]	0.76	[0.08,6.78]
Primary Care Providers/10,000 Population	0.99	[0.95,1.04]	1.01	[0.99,1.03]	1.01**	[1.00,1.02]	0.96	[0.90,1.03]	0.97	[0.94,1.00]	0.97***	[0.96,0.99]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.43	[0.16,1.14]	0.75	[0.46,1.21]	0.51***	[0.35,0.74]	7.07*	[1.32,37.82]	1.58	[0.75,3.33]	1.27	[0.72,2.25]
Hispanic	0.47	[0.12,1.94]	0.91	[0.40,2.06]	0.51	[0.23,1.13]	3.77	[0.28,51.43]	1.61	[0.46,5.64]	1.30	[0.37,4.57]
Year												
2005	1.87	[0.20,17.31]	1.39	[0.73,2.65]	0.94	[0.75,1.18]	0.65	[0.06,6.81]	2.22*	[1.15,4.25]	1.55**	[1.20,2.02]
2006	1.76	[0.19,16.14]	1.40	[0.73,2.66]	0.99	[0.79,1.24]	0.81	[0.08,8.40]	2.15*	[1.13,4.12]	1.62***	[1.25,2.10]
2007	3.09	[0.34,28.30]	2.19*	[1.15,4.16]	1.40**	[1.12,1.75]	0.90	[0.09,9.40]	2.24*	[1.17,4.28]	1.68***	[1.30,2.18]
2008	3.33	[0.36,30.39]	2.48**	[1.31,4.71]	1.51***	[1.21,1.89]	0.79	[0.08,8.21]	2.29*	[1.20,4.37]	1.64***	[1.27,2.13]
Constant	0.28	[0.01,8.85]	0.09**	[0.02,0.41]	0.34*	[0.14,0.81]	0.12	[0.00,8.27]	0.40	[0.07,2.21]	0.13***	[0.05,0.36]
Average practice intercept	0.04	[0.00,11586572.74]	0.27***	[0.21,0.36]	0.24***	[0.20,0.30]	0.70*	[0.54,0.92]	0.63***	[0.54,0.73]	0.46***	[0.39,0.54]
N	2139		9054		18500		2139		9054		18500	

Notes : A1c is hemoglobin A1c test, LDL is low-density lipoprotein test.PCP is primary care provider. Logit models used for all outcomes.
*p<0.05,**p<0.01,***p<0.001

Table 5.12b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed Effects Models, by Practice Size

	>=1 A1C			>=1 LDL			>=1 Eye Exam			Attention for Nephropathy		
	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)
CCNC Patients (omitted=Very Low)												
Low												
MLM AME	0.0736*	0.012	- 0.0313	0.046	0.003	- 0.010	- 0.022	- 0.025	0.003	- 0.030	- 0.013	- 0.056*
	[0.0050,0.1422]	[-0.042,0.065]	[-0.085,0.022]	[-0.023,0.114]	[-0.053,0.060]	[-0.062,0.042]	[-0.066,0.022]	[-0.064,0.014]	[-0.039,0.045]	[-0.091,0.031]	[-0.055,0.028]	[-0.099,-0.012]
FE AME	0.0196	0.0761	- 0.0269	0.0280	0.0180	0.0010	- 0.1316**	- 0.0235	0.0172	- 0.0918	- 0.0190	- 0.0954**
	[-0.0842,0.1235]	[-0.0096,0.1619]	[-0.0745,0.0206]	[-0.1007,0.1567]	[-0.0803,0.1163]	[-0.0501,0.0521]	[-0.2303,-0.0330]	[-0.1286,0.0815]	[-0.0557,0.0902]	[-0.1952,0.0117]	[-0.0780,0.0399]	[-0.1554,-0.0354]
Medium												
MLM AME	0.071	- 0.008	- 0.055	0.051	- 0.008	- 0.019	- 0.014	- 0.034	- 0.006	- 0.007	- 0.011	- 0.031
	[-0.040,0.181]	[-0.076,0.061]	[-0.130,0.020]	[-0.059,0.162]	[-0.081,0.064]	[-0.092,0.055]	[-0.087,0.050]	[-0.080,0.012]	[-0.058,0.047]	[-0.103,0.089]	[-0.060,0.038]	[-0.080,0.019]
FE AME	0.0381	0.0828	- 0.0761*	0.0944	- 0.0017	- 0.0173	- 0.1934*	- 0.0436	0.0339	- 0.0693	0.0022	- 0.0909*
	[-0.1209,0.1970]	[-0.0211,0.1868]	[-0.1462,-0.0060]	[-0.0918,0.2807]	[-0.1166,0.1131]	[-0.0906,0.0561]	[-0.3754,-0.0114]	[-0.1636,0.0764]	[-0.0520,0.1198]	[-0.2267,0.0880]	[-0.0789,0.0832]	[-0.1655,-0.0162]
High												
MLM AME	- 0.07	- 0.006	- 0.089*	- 0.02	- 0.024	- 0.050	- 0.106*	- 0.0484	- 0.002	- 0.02	- 0.010	- 0.0493*
	[-0.24,0.11]	[-0.075,0.063]	[-0.165,-0.013]	[-0.19,0.14]	[-0.101,0.050]	[-0.123,0.023]	[-0.196,-0.017]	[-0.096812,0.000012]	[-0.050,0.045]	[-0.16,0.12]	[-0.061,0.041]	[-0.0969,-0.0017]
FE AME	- 0.2799	0.1001	- 0.1025*	- 0.0433	- 0.0253	- 0.0440	- 0.4536***	- 0.0184	0.0327	- 0.0939	0.0036	- 0.1185**
	[-0.6262,0.0664]	[-0.0167,0.2168]	[-0.1870,-0.0180]	[-0.4609,0.3743]	[-0.1543,0.1037]	[-0.1350,0.0470]	[-0.6900,-0.2172]	[-0.1513,0.1144]	[-0.0612,0.1267]	[-0.2805,0.0926]	[-0.0975,0.1048]	[-0.2003,-0.0367]
Very High												
MLM AME	- 0.116	0.024	- 0.0616	0.05	- 0.028	- 0.0686	- 0.117*	- 0.0489*	- 0.028	0.160**	- 0.008	- 0.0539*
	[-0.302,0.071]	[-0.041,0.090]	[-0.1320,0.0088]	[-0.11,0.20]	[-0.100,0.055]	[-0.1431,0.0059]	[-0.215-0.020]	[-0.0959,-0.0019]	[-0.072,0.016]	[0.080,0.240]	[-0.057,0.042]	[-0.0999,-0.0078]
FE AME	- 0.3416	0.1513*	- 0.0775	0.0136	- 0.0225	- 0.0749	- 0.5312**	- 0.0247	0.0327	- 0.0434	- 0.0106	- 0.1200**
	[-0.6925,0.0093]	[0.0094,0.2931]	[-0.1690,0.0140]	[-0.3781,0.4053]	[-0.1843,0.1393]	[-0.1839,0.0340]	[-0.7721,-0.2902]	[-0.1811,0.1316]	[-0.0659,0.1313]	[-0.2191,0.1323]	[-0.1190,0.0979]	[-0.2048,-0.0352]

Notes: Logit models used for mult-level models. Cluster robust linear probability models used for fixed-effects models.

*p<0.05,**p<0.01,***p<0.001

Table 5.13a: Multi-Level Estimates of the Effect of CCNC on Yearly Health Care Utilization, by Practice Size

	>=1 IP Admission						>=1 ED Visit						# PCP Visits					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	IRR	95% CI	IRR	95% CI	IRR	95% CI
CCNC	0.87	[0.59,1.30]	1.00	[0.81,1.23]	0.93	[0.77,1.12]	0.98	[0.72,1.34]	0.95	[0.81,1.12]	1.06	[0.91,1.23]	0.92*	[0.86,0.99]	0.98	[0.94,1.02]	0.93***	[0.90,0.95]
	(AME = -0.01)		(AME = 0.000)		(AME = -0.006)		(AME = -0.003)		(AME = -0.007)		(AME = 0.007)		(AME = -0.63)		(AME = -0.08)		(AME = -0.278)	
Ever CCNC	1.00	[0.68,1.47]	1.08	[0.88,1.33]	1.05	[0.86,1.29]	1.17	[0.86,1.59]	1.20*	[1.01,1.42]	1.12	[0.95,1.33]	0.96	[0.85,1.08]	1.05	[0.98,1.12]	1.08*	[1.01,1.16]
CCNC Early Adopter	1.28	[0.93,1.76]	1.02	[0.87,1.20]	1.11	[0.96,1.28]	1.19	[0.91,1.54]	1.14*	[1.00,1.30]	1.05	[0.93,1.20]	1.09	[0.93,1.27]	0.95	[0.88,1.02]	1.05	[0.98,1.13]
Person-level controls																		
Age	1.01	[0.91,1.11]	0.99	[0.94,1.05]	0.95*	[0.91,0.99]	0.96	[0.89,1.02]	0.95*	[0.91,0.99]	0.94***	[0.91,0.97]	1.00	[0.99,1.01]	0.99*	[0.98,1.00]	1.00	[0.99,1.01]
Age^2	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00	[1.00,1.00]	1.00**	[1.00,1.00]	1.00	[1.00,1.00]
Male	0.90	[0.76,1.07]	1.01	[0.91,1.13]	0.93	[0.86,1.01]	0.77***	[0.67,0.87]	0.70***	[0.65,0.76]	0.77***	[0.72,0.82]	0.86***	[0.83,0.88]	0.80***	[0.79,0.81]	0.79***	[0.78,0.80]
Charlson Index	3.43***	[3.01,3.92]	3.19***	[2.93,3.47]	3.04***	[2.86,3.24]	1.88***	[1.69,2.09]	1.85***	[1.72,1.98]	1.87***	[1.77,1.97]	1.40***	[1.37,1.43]	1.42***	[1.40,1.43]	1.46***	[1.45,1.48]
Charlson Index^2	0.92***	[0.91,0.94]	0.93***	[0.92,0.94]	0.94***	[0.93,0.94]	0.96***	[0.95,0.97]	0.96***	[0.95,0.96]	0.96***	[0.95,0.96]	0.98***	[0.97,0.98]	0.98***	[0.97,0.98]	0.98***	[0.97,0.98]
Eligibility (omitted = subscriber)																		
Spouse	1.27*	[1.01,1.61]	1.26**	[1.08,1.46]	1.28***	[1.14,1.43]	0.92	[0.75,1.12]	0.97	[0.86,1.10]	0.97	[0.89,1.07]	1.07***	[1.03,1.11]	1.05***	[1.02,1.07]	1.08***	[1.06,1.10]
Other	1.51	[0.29,7.75]	2.67*	[1.17,6.08]	0.63	[0.33,1.21]	0.59	[0.15,2.25]	1.08	[0.57,2.04]	0.47***	[0.30,0.73]	0.86	[0.64,1.16]	0.70***	[0.59,0.83]	0.80***	[0.72,0.89]
Plan Type (omitted = CMM)																		
Smart Choice	0.56***	[0.40,0.78]	0.76*	[0.60,0.96]	0.82*	[0.68,0.98]	0.70*	[0.52,0.93]	0.70***	[0.59,0.85]	0.79**	[0.69,0.92]	1.10**	[1.04,1.17]	1.00	[0.96,1.04]	1.00	[0.97,1.03]
Smart Choice Basic	0.66*	[0.46,0.94]	0.68**	[0.53,0.87]	0.81*	[0.67,0.98]	0.92	[0.69,1.24]	0.84	[0.70,1.02]	0.89	[0.77,1.04]	1.02	[0.96,1.09]	0.96*	[0.92,1.00]	0.94***	[0.91,0.97]
Smart Choice Plus	0.79	[0.51,1.23]	1.14	[0.85,1.54]	1.28*	[1.02,1.59]	0.78	[0.53,1.13]	0.98	[0.78,1.25]	0.97	[0.81,1.16]	1.28***	[1.19,1.38]	1.17***	[1.11,1.22]	1.14***	[1.10,1.18]
Practice and county-level controls																		
# Primary Care Providers	—	—	0.97	[0.90,1.05]	1.00	[1.00,1.01]	—	—	0.99	[0.93,1.05]	1.00	[1.00,1.01]	—	—	0.97***	[0.96,0.99]	1.00	[1.00,1.00]
Multisite Practice	—	—	0.74	[0.35,1.55]	0.91	[0.48,1.69]	—	—	1.09	[0.64,1.87]	0.80	[0.44,1.46]	—	—	1.28	[0.93,1.78]	1.12	[0.78,1.62]
Rural-Urban																		
Non-urban, Non-rural	1.10	[0.88,1.37]	1.04	[0.90,1.20]	1.13	[0.97,1.30]	1.08	[0.90,1.30]	1.16*	[1.04,1.31]	1.20**	[1.05,1.37]	1.08	[0.99,1.18]	0.97	[0.92,1.03]	1.07	[1.00,1.15]
Rural	1.08	[0.57,2.03]	0.82	[0.58,1.17]	0.94	[0.66,1.34]	0.71	[0.42,1.19]	0.95	[0.73,1.25]	1.27	[0.95,1.71]	1.15	[0.92,1.43]	0.94	[0.82,1.07]	0.94	[0.81,1.09]
Community-based Practice	0.82	[0.52,1.30]	0.85	[0.67,1.07]	0.85*	[0.73,1.00]	0.77	[0.52,1.13]	0.79*	[0.64,0.96]	0.96	[0.83,1.12]	0.88	[0.73,1.07]	0.81***	[0.73,0.90]	0.88**	[0.82,0.96]
County Proportion Poverty	1.85	[0.10,32.75]	0.49	[0.08,2.86]	1.13	[0.22,5.78]	0.23	[0.02,2.39]	0.85	[0.20,3.65]	0.31	[0.07,1.33]	1.97	[0.80,4.83]	1.30	[0.74,2.30]	3.28***	[1.99,5.41]
Primary Care Providers/10,000 Popu	0.97	[0.94,1.00]	0.99	[0.98,1.01]	1.00	[0.99,1.01]	1.01	[0.99,1.03]	0.99	[0.98,1.00]	1.00	[0.99,1.01]	1.00	[0.99,1.01]	1.00	[0.99,1.00]	1.00	[1.00,1.01]
County Proportion Race/Ethnicity																		
Non-white, not Hispanic	1.01	[0.46,2.23]	1.10	[0.67,1.81]	0.94	[0.61,1.42]	0.80	[0.42,1.50]	1.13	[0.75,1.69]	2.15***	[1.48,3.13]	1.01	[0.76,1.35]	1.09	[0.90,1.30]	0.98	[0.82,1.16]
Hispanic	2.09	[0.54,8.10]	0.87	[0.36,2.11]	0.88	[0.36,2.17]	0.63	[0.20,1.98]	0.61	[0.30,1.25]	1.28	[0.56,2.93]	2.27**	[1.31,3.93]	0.84	[0.59,1.19]	1.22	[0.83,1.81]
Year																		
2005	1.05	[0.75,1.47]	0.93	[0.74,1.17]	1.06	[0.89,1.26]	1.31	[0.99,1.72]	1.17	[0.98,1.41]	1.20*	[1.04,1.38]	0.95	[0.90,1.01]	0.94**	[0.90,0.97]	0.97*	[0.94,0.99]
2006	0.97	[0.69,1.36]	0.93	[0.74,1.17]	1.15	[0.96,1.37]	1.28	[0.98,1.69]	1.20*	[1.00,1.45]	1.19*	[1.03,1.37]	0.91**	[0.85,0.96]	0.91***	[0.88,0.95]	0.95***	[0.92,0.98]
2007	1.25	[0.90,1.74]	0.80	[0.64,1.01]	1.10	[0.92,1.32]	1.29	[0.99,1.69]	1.20*	[1.00,1.44]	1.16*	[1.01,1.34]	1.00	[0.95,1.07]	0.95**	[0.91,0.98]	0.99	[0.96,1.02]
2008	1.09	[0.78,1.54]	0.83	[0.66,1.05]	1.00	[0.83,1.20]	1.34*	[1.02,1.75]	1.23*	[1.03,1.48]	1.23**	[1.07,1.42]	0.97	[0.91,1.03]	0.94**	[0.90,0.98]	0.99	[0.96,1.02]
Constant	0.03**	[0.00,0.34]	0.06***	[0.01,0.25]	0.10***	[0.03,0.27]	0.71	[0.14,3.73]	0.91	[0.34,2.46]	0.64	[0.30,1.34]	1.90**	[1.25,2.89]	4.17***	[3.26,5.35]	1.84***	[1.51,2.25]
Average practice intercept	0.33***	[0.19,0.55]	0.25***	[0.15,0.40]	0.25***	[0.19,0.32]	0.36***	[0.27,0.49]	0.35***	[0.29,0.41]	0.31***	[0.26,0.36]	0.44***	[0.41,0.47]	0.35***	[0.33,0.37]	0.25***	[0.23,0.28]
N	7850		20393		35070		7850		20393		35070		7850		20393		35070	

Notes: PCP is primary care provider. Logit models used for IP and ED visits. Zero-truncated Poisson with reintroduced zeros used for PCP and OP vists. Robust OLS used for Continuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.13a: Continued

	# Total OP Visits						Continuity of Care					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	IRR	95% CI	IRR	95% CI	IRR	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI
CCNC	0.93**	[0.88,0.98]	0.97	[0.95,1.00]	0.95***	[0.92,0.97]	0.0189	[-0.0151,0.0529]	0.0002	[-0.0207,0.0210]	-0.0241*	[-0.0451,-0.0031]
	(AME = -0.51)		(AME = -0.18)		(AME = -0.372)		(AME = 0.0126)		(AME = -0.006)		(AME = -0.0172)	
Ever CCNC	0.93	[0.84,1.02]	1.04	[0.99,1.10]	1.05	[1.00,1.10]	0.005	[-0.0340,0.0441]	0.0219	[-0.0012,0.0450]	0.0558***	[0.0291,0.0825]
CCNC Early Adopter	1.09	[0.97,1.24]	0.92**	[0.87,0.97]	0.97	[0.92,1.02]	0.017	[-0.0215,0.0555]	0.0210*	[0.0019,0.0402]	0.0091	[-0.0099,0.0281]
Person-level controls												
Age	0.98***	[0.97,0.99]	0.97***	[0.97,0.98]	0.99***	[0.98,0.99]	0.0088*	[0.0001,0.0176]	0.0180***	[0.0129,0.0230]	0.0101***	[0.0060,0.0143]
Age^2	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	-0.0001*	[-0.0002,-0.0000]	-0.0002***	[-0.0003,-0.0001]	-0.0001***	[-0.0002,-0.0001]
Male	0.79***	[0.78,0.81]	0.76***	[0.75,0.77]	0.76***	[0.75,0.77]	0.0796***	[0.0619,0.0973]	0.0743***	[0.0643,0.0843]	0.0662***	[0.0568,0.0756]
Charlson Index	1.44***	[1.42,1.46]	1.43***	[1.42,1.45]	1.48***	[1.47,1.49]	-0.0542***	[-0.0650,-0.0434]	-0.0557***	[-0.0635,-0.0478]	-0.0495***	[-0.0566,-0.0423]
Charlson Index^2	0.98***	[0.98,0.98]	0.98***	[0.98,0.98]	0.98***	[0.98,0.98]	0.0028***	[0.0015,0.0041]	0.0030***	[0.0021,0.0039]	0.0029***	[0.0022,0.0037]
Eligibility (omitted = subscriber)												
Spouse	1.09***	[1.06,1.12]	1.07***	[1.05,1.09]	1.11***	[1.10,1.12]	-0.0109	[-0.0350,0.0133]	-0.0276***	[-0.0430,-0.0122]	-0.0257***	[-0.0378,-0.0135]
Other	0.93	[0.75,1.15]	0.72***	[0.64,0.82]	0.85***	[0.79,0.92]	-0.041	[-0.2657,0.1837]	0.0077	[-0.0728,0.0882]	-0.0282	[-0.0916,0.0352]
Plan Type (omitted = CMM)												
Smart Choice	1.11***	[1.06,1.16]	1.02	[0.99,1.05]	1.03*	[1.00,1.05]	0.0092	[-0.0225,0.0409]	-0.0296*	[-0.0544,-0.0049]	-0.0062	[-0.0268,0.0143]
Smart Choice Basic	0.98	[0.93,1.03]	0.91***	[0.89,0.94]	0.93***	[0.91,0.95]	0.0422*	[0.0065,0.0779]	0.0176	[-0.0082,0.0434]	0.0167	[-0.0049,0.0382]
Smart Choice Plus	1.33***	[1.26,1.41]	1.20***	[1.16,1.24]	1.17***	[1.14,1.20]	-0.014	[-0.0578,0.0298]	-0.0501**	[-0.0822,-0.0181]	-0.0244*	[-0.0480,-0.0008]
Practice and county-level controls												
# Primary Care Providers	—	—	0.98*	[0.97,1.00]	1.00*	[1.00,1.00]	—	—	-0.0095*	[-0.0172,-0.0018]	0	[-0.0004,0.0005]
Multisite Practice	—	—	1.36*	[1.04,1.76]	0.95	[0.73,1.23]	—	—	-0.078	[-0.1617,0.0057]	0.0843***	[0.0589,0.1098]
Rural-Urban												
Non-urban, Non-rural	0.99	[0.92,1.07]	0.95*	[0.90,0.99]	0.95	[0.91,1.00]	0.0135	[-0.0130,0.0400]	0.0017	[-0.0151,0.0186]	0.0316**	[0.0110,0.0521]
Rural	1.12	[0.95,1.33]	0.91	[0.82,1.02]	0.85**	[0.77,0.95]	0.0098	[-0.0574,0.0769]	0.0257	[-0.0142,0.0655]	0.0668**	[0.0210,0.1126]
Community-based Practice	0.86*	[0.74,0.99]	0.91*	[0.83,0.99]	0.98	[0.92,1.03]	0.0696*	[0.0110,0.1281]	0.0329	[-0.0028,0.0686]	0.0147	[-0.0115,0.0409]
County Proportion Poverty	2.64**	[1.32,5.27]	0.91	[0.59,1.42]	1.25	[0.86,1.82]	-0.1842	[-0.4763,0.1080]	0.0557	[-0.1414,0.2527]	0.1643	[-0.0412,0.3698]
Primary Care Providers/10,000 Popu	1.00	[0.99,1.01]	1.00	[0.99,1.00]	0.99**	[0.99,1.00]	-0.0006	[-0.0038,0.0026]	0.0004	[-0.0014,0.0021]	0.0009	[-0.0006,0.0025]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.91	[0.73,1.14]	1.02	[0.88,1.18]	0.92	[0.82,1.05]	0.0073	[-0.0780,0.0926]	0.0042	[-0.0525,0.0608]	0.0271	[-0.0265,0.0806]
Hispanic	1.67*	[1.09,2.55]	0.68**	[0.51,0.89]	0.76	[0.57,1.01]	0.2050**	[0.0499,0.3600]	0.0573	[-0.0538,0.1684]	0.0542	[-0.0752,0.1836]
Year												
2005	0.98	[0.94,1.03]	1.00	[0.97,1.03]	1.04***	[1.02,1.07]	-0.0473**	[-0.0761,-0.0184]	-0.0494***	[-0.0710,-0.0278]	-0.0271**	[-0.0447,-0.0095]
2006	0.99	[0.94,1.03]	1.00	[0.96,1.03]	1.03**	[1.01,1.06]	-0.0582***	[-0.0866,-0.0298]	-0.0577***	[-0.0799,-0.0354]	-0.0395***	[-0.0571,-0.0218]
2007	1.11***	[1.06,1.16]	1.05**	[1.02,1.08]	1.10***	[1.07,1.12]	-0.0742***	[-0.1022,-0.0462]	-0.0788***	[-0.1009,-0.0567]	-0.0559***	[-0.0747,-0.0371]
2008	1.12***	[1.07,1.17]	1.05***	[1.02,1.09]	1.11***	[1.09,1.14]	-0.0861***	[-0.1144,-0.0578]	-0.0853***	[-0.1081,-0.0624]	-0.0644***	[-0.0829,-0.0458]
Constant	4.93***	[3.60,6.75]	9.31***	[7.69,11.26]	5.52***	[4.77,6.39]	0.2739*	[0.0612,0.4867]	0.1419*	[0.0067,0.2771]	0.2364***	[0.1331,0.3398]
Average practice intercept	0.35***	[0.33,0.38]	0.28***	[0.27,0.30]	0.18***	[0.17,0.20]	-2.4782***	[-2.6085,-2.3479]	-2.5877***	[-2.6828,-2.4926]	-2.7860***	[-2.8874,-2.6846]
N	7850		20393		35070		6830		17399		29573	

Notes : PCP is primary care provider. Logit models used for IP and ED visits. Zero-truncated Poisson with reintroduced zeros used for PCP and OP vists. Robust OLS used for Continuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.13b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models, by Practice Size

	>=1 IP			>=1 ED		
	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)
CCNC						
MLM AME	- 0.010	0.000	- 0.006	- 0.003	- 0.007	0.007
	[-0.039,0.019]	[-0.015,0.015]	[-0.020,0.0082]	[-0.045,0.039]	[-0.029,0.015]	[-0.010,0.024]
FE AME	- 0.006	- 0.003	0.001	0.018	- 0.009	0.003
	[-0.048,0.036]	[-0.028,0.022]	[-0.018,0.019]	[-0.031,0.067]	[-0.038,0.019]	[-0.016,0.022]

Notes : For multi-level models: logit models used for IP and ED visits, zero-truncated Poisson with reintroduced zeros used for PCP and OP vists, robust OLS used for Continuity of Care. For fixed-effects models: Cluster-robust LPMs used for IP and ED visits, OLS used for PCP and OP visits and Contintinuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.13b: Continued

	#PCP			#OP			COC		
	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)
CCNC									
MLM AME	- 0.63**	- 0.08	- 0.278**	- 0.51**	- 0.18	- 0.372**	0.013	- 0.006	- 0.0172
	[-0.90,-0.36]	[-0.22,0.06]	[-0.38,-0.17]	[-0.88,-0.14]	[-0.372,0.012]	[-0.52,-0.22]	[-0.030,0.055]	[-0.029,0.017]	[-0.0369,0.0025]
FE AME	- 0.22	- 0.08	- 0.297*	- 0.46	- 0.12	- 0.355*	0.0359	- 0.006	- 0.0242*
	[-0.70,0.25]	[-0.32,0.16]	[-0.547,-0.047]	[-1.10,0.18]	[-0.50,0.26]	[-0.673,-0.038]	[-0.0015,0.0734]	[-0.031,0.019]	[-0.0463,-0.0021]

Notes : For multi-level models: logit models used for IP and ED visits, zero-truncated Poisson with reintroduced zeros used for PCP and OP vists, robust OLS used for Continuity of Care. For fixed-effects models: Cluster-robust LPMs used for IP and ED visits, OLS used for PCP and OP visits and Contintinuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.14a: Multi-Level Estimates of the Moderating Effect of CCNC Patient Load on Yearly Health Care Utilization, by Practice Size

	>=1 IP Admission						>=1 ED Visit						# PCP Visits					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	IRR	95% CI	IRR	95% CI	IRR	95% CI
CCNC Patients (omitted = Very Low)																		
Low	0.58**	[0.40,0.84]	1.04	[0.80,1.36]	0.89	[0.68,1.17]	0.99	[0.73,1.33]	1.08	[0.85,1.38]	0.97	[0.77,1.22]	0.97	[0.87,1.09]	0.99	[0.91,1.07]	0.97	[0.90,1.04]
	(AME = -0.0408)		(AME = 0.0033)		(AME = -0.0087)		(AME = -0.0020)		(AME = 0.0107)		(AME = -0.0044)		(AME = -0.0993)		(AME = -0.0489)		(AME = -0.1184)	
Medium	0.92	[0.55,1.54]	0.96	[0.73,1.26]	1.04	[0.78,1.38]	1.17	[0.77,1.76]	1.22	[0.95,1.56]	0.95	[0.74,1.21]	0.90	[0.77,1.06]	0.94	[0.87,1.03]	1.01	[0.93,1.10]
	(AME = -0.0073)		(AME = -0.0029)		(AME = 0.0030)		(AME = 0.0220)		(AME = 0.0285)		(AME = -0.0074)		(AME = -0.3682)		(AME = -0.2182)		(AME = 0.0483)	
High	1.29	[0.64,2.62]	1.00	[0.72,1.39]	1.13	[0.85,1.50]	1.34	[0.71,2.53]	1.22	[0.92,1.64]	1.09	[0.85,1.40]	0.82	[0.65,1.05]	0.90*	[0.82,1.00]	1.00	[0.92,1.10]
	(AME = 0.0241)		(AME = 0.0002)		(AME = 0.0101)		(AME = 0.0428)		(AME = 0.0295)		(AME = 0.0126)		(AME = -0.6756)		(AME = -0.3748)		(AME = 0.0088)	
Very High	0.35*	[0.13,0.92]	0.67*	[0.48,0.93]	0.97	[0.74,1.27]	1.49	[0.79,2.81]	1.30	[0.99,1.73]	1.18	[0.93,1.49]	0.88	[0.70,1.11]	0.94	[0.85,1.04]	1.01	[0.92,1.10]
	(AME = -0.067)		(AME = -0.0268)		(AME = -0.0022)		(AME = 0.0607)		(AME = 0.0393)		(AME = 0.0234)		(AME = -0.4548)		(AME = -0.2475)		(AME = 0.0302)	
CCNC Early Adopter	1.36	[0.97,1.90]	1.06	[0.90,1.26]	1.08	[0.95,1.24]	1.24	[0.94,1.63]	1.12	[0.96,1.31]	1.01	[0.89,1.14]	1.08	[0.93,1.25]	0.96	[0.89,1.03]	1.04	[0.97,1.13]
Person-level controls																		
Age	1.07	[0.89,1.30]	0.99	[0.91,1.08]	0.99	[0.93,1.05]	1.06	[0.93,1.21]	0.95	[0.89,1.00]	0.94**	[0.91,0.98]	1.01	[0.98,1.04]	0.98***	[0.96,0.99]	1.01**	[1.00,1.02]
Age^2	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00***	[1.00,1.00]	1.00	[1.00,1.00]
Male	0.96	[0.69,1.34]	0.90	[0.76,1.06]	0.96	[0.86,1.07]	0.76*	[0.59,0.97]	0.68***	[0.60,0.76]	0.77***	[0.71,0.84]	0.81***	[0.77,0.85]	0.79***	[0.77,0.81]	0.78***	[0.76,0.79]
Charlson Index	3.74***	[2.92,4.80]	3.30***	[2.91,3.75]	2.80***	[2.59,3.03]	1.85***	[1.52,2.25]	1.88***	[1.70,2.08]	1.78***	[1.66,1.90]	1.39***	[1.34,1.44]	1.42***	[1.39,1.45]	1.46***	[1.44,1.47]
Charlson Index^2	0.92***	[0.90,0.95]	0.93***	[0.91,0.94]	0.94***	[0.94,0.95]	0.97*	[0.95,0.99]	0.95***	[0.94,0.97]	0.96***	[0.96,0.97]	0.98***	[0.97,0.98]	0.97***	[0.97,0.98]	0.98***	[0.98,0.98]
Eligibility (omitted = subscriber)																		
Spouse	1.66*	[1.06,2.58]	1.56***	[1.24,1.96]	1.36***	[1.17,1.58]	0.84	[0.56,1.24]	1.03	[0.85,1.24]	0.94	[0.82,1.07]	1.21***	[1.12,1.30]	1.06**	[1.02,1.10]	1.13***	[1.11,1.16]
Other	8.54	[0.32,224.82]	3.32*	[1.10,10.08]	0.29	[0.08,1.03]	2.38	[0.16,35.74]	1.04	[0.41,2.61]	0.58	[0.33,1.04]	1.27	[0.57,2.83]	0.55***	[0.43,0.71]	0.98	[0.85,1.12]
Plan Type (omitted = CMM)																		
Smart Choice	0.89	[0.39,2.03]	0.67*	[0.46,0.97]	0.81	[0.62,1.05]	0.55*	[0.31,0.98]	0.56***	[0.42,0.74]	0.81	[0.66,1.00]	1.13	[0.99,1.29]	0.94*	[0.89,1.00]	0.94**	[0.91,0.98]
Smart Choice Basic	1.02	[0.44,2.37]	0.68*	[0.46,0.99]	0.79	[0.60,1.03]	0.87	[0.49,1.56]	0.75	[0.57,1.00]	0.89	[0.72,1.11]	1.09	[0.96,1.25]	0.89***	[0.84,0.94]	0.87***	[0.84,0.91]
Smart Choice Plus	0.98	[0.35,2.74]	1.24	[0.79,1.97]	1.29	[0.95,1.76]	1.28	[0.63,2.63]	0.88	[0.61,1.26]	1.04	[0.80,1.33]	1.60***	[1.37,1.87]	1.11**	[1.03,1.20]	1.06*	[1.01,1.11]
Practice and county-level controls																		
# Primary Care Providers	—	—	1.02	[0.91,1.15]	1.00	[1.00,1.01]	—	—	1.01	[0.92,1.10]	1.00	[1.00,1.00]	—	—	0.99	[0.96,1.01]	1.00	[1.00,1.00]
Multisite Practice	—	—	0.60	[0.27,1.37]	0.91	[0.47,1.74]	—	—	1.05	[0.54,2.05]	0.71	[0.39,1.33]	—	—	1.16	[0.82,1.65]	1.11	[0.76,1.63]
Rural-Urban																		
Non-urban, Non-rural	0.73	[0.47,1.13]	1.03	[0.85,1.24]	1.17	[0.99,1.37]	1.19	[0.85,1.68]	1.09	[0.92,1.30]	1.22*	[1.05,1.42]	0.89	[0.75,1.06]	0.95	[0.88,1.03]	1.06	[0.97,1.16]
Rural	0.99	[0.40,2.47]	1.02	[0.68,1.52]	0.93	[0.63,1.37]	0.56	[0.26,1.21]	0.90	[0.64,1.28]	1.50**	[1.10,2.03]	0.81	[0.59,1.10]	0.96	[0.82,1.13]	0.93	[0.79,1.11]
Community-based Practice	1.08	[0.30,3.88]	1.03	[0.70,1.51]	0.89	[0.74,1.07]	0.57	[0.24,1.37]	0.83	[0.58,1.19]	0.97	[0.81,1.16]	1.01	[0.71,1.42]	1.08	[0.91,1.29]	1.00	[0.89,1.13]
County Proportion Poverty	90.86	[0.37,22075.23]	0.17	[0.01,2.16]	0.16	[0.02,1.08]	0.27	[0.00,18.58]	0.52	[0.06,4.88]	0.12*	[0.02,0.65]	7.48*	[1.37,40.90]	1.12	[0.51,2.48]	2.99***	[1.57,5.69]
Primary Care Providers/10,000 Population	0.98	[0.91,1.04]	0.99	[0.96,1.02]	1.00	[0.98,1.01]	1.00	[0.95,1.05]	1.00	[0.97,1.02]	1.01	[1.00,1.02]	1.00	[0.98,1.03]	0.99	[0.98,1.00]	1.00	[0.99,1.01]
County Proportion Race/Ethnicity																		
Non-white, not Hispanic	0.76	[0.14,4.02]	1.71	[0.84,3.49]	1.34	[0.80,2.22]	0.46	[0.13,1.68]	1.32	[0.71,2.45]	3.05***	[1.95,4.77]	0.70	[0.40,1.22]	1.11	[0.87,1.41]	0.96	[0.77,1.20]
Hispanic	1.49	[0.14,16.07]	2.52	[0.79,8.08]	1.14	[0.41,3.17]	0.12*	[0.02,0.88]	0.83	[0.30,2.29]	1.94	[0.75,4.96]	1.78	[0.68,4.62]	0.83	[0.54,1.30]	1.57	[0.94,2.63]
Year																		
2005	0.76	[0.06,9.04]	1.52	[0.57,4.06]	1.12	[0.76,1.66]	0.66	[0.10,4.31]	1.18	[0.56,2.48]	1.22	[0.91,1.65]	0.96	[0.60,1.53]	0.90	[0.77,1.05]	0.86***	[0.81,0.91]
2006	0.57	[0.05,6.76]	1.34	[0.50,3.57]	1.29	[0.88,1.90]	0.65	[0.10,4.26]	1.28	[0.61,2.67]	1.16	[0.86,1.55]	0.94	[0.59,1.51]	0.90	[0.77,1.05]	0.86***	[0.81,0.91]
2007	0.91	[0.08,10.63]	1.19	[0.45,3.17]	1.26	[0.86,1.85]	0.53	[0.08,3.45]	1.28	[0.61,2.67]	1.18	[0.88,1.58]	1.12	[0.70,1.79]	0.92	[0.79,1.08]	0.88***	[0.83,0.93]
2008	0.87	[0.07,10.17]	1.29	[0.49,3.42]	1.05	[0.71,1.55]	0.59	[0.09,3.85]	1.22	[0.59,2.54]	1.24	[0.93,1.66]	1.07	[0.67,1.72]	0.91	[0.78,1.07]	0.88***	[0.83,0.93]
Constant	0.01	[0.00,1.09]	0.03**	[0.00,0.33]	0.04***	[0.01,0.19]	0.31	[0.01,13.61]	1.05	[0.20,5.51]	0.62	[0.23,1.70]	1.18	[0.47,2.98]	5.45***	[3.62,8.19]	1.50**	[1.13,1.99]
Average practice intercept	0.00	[0.00,0.00]	0.05	[0.00,15435.99]	0.18***	[0.10,0.31]	0.27**	[0.10,0.71]	0.39***	[0.31,0.49]	0.26***	[0.20,0.33]	0.35***	[0.30,0.42]	0.32***	[0.29,0.35]	0.26***	[0.23,0.29]
N	2139		9050		18500		2139		9050		18500		2139		9050		18500	

Notes: PCP is primary care provider. Logit models used for IP and ED visits. Zero-truncated Poisson with reintroduced zeros used for PCP and OP vists. Robust OLS used for Continuity of Care.
Continuity of Care models only for patients with >=3 OP visits during the year.
*p<0.05,**p<0.01,***p<0.001

Table 5.14a: Continued

	# Total OP Visits						Continuity of Care					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	IRR	95% CI	IRR	95% CI	IRR	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI
CCNC Patients (omitted = Very Low)												
Low	0.92	[0.84,1.01]	0.93*	[0.87,0.99]	0.99	[0.94,1.04]	0.0055	[-0.0352,0.0461]	0.0424**	[0.0124,0.0723]	0.0291	[-0.0006,0.0587]
	(AME = -0.5565)		(AME = -0.4923)		(AME = -0.0570)		(AME = -0.0001)		(AME = 0.0507)		(AME = 0.0223)	
Medium	0.91	[0.80,1.03]	0.89**	[0.84,0.96]	0.98	[0.92,1.04]	-0.0119	[-0.0608,0.0371]	0.0548***	[0.0240,0.0855]	0.0496**	[0.0200,0.0792]
	(AME = -0.6404)		(AME = -0.7474)		(AME = -0.1179)		(AME = -0.0193)		(AME = 0.0631)		(AME = 0.0446)	
High	0.81*	[0.67,0.98]	0.88**	[0.81,0.95]	0.98	[0.92,1.05]	0.0571	[-0.0471,0.1614]	0.0702***	[0.0349,0.1055]	0.0384**	[0.0092,0.0676]
	(AME = -1.3392)		(AME = -0.8627)		(AME = -0.1287)		(AME = 0.0748)		(AME = 0.0859)		(AME = 0.0348)	
Very High	0.80*	[0.66,0.96]	0.89**	[0.82,0.97]	0.96	[0.90,1.02]	0.0491	[-0.0240,0.1222]	0.0803***	[0.0464,0.1141]	0.0486***	[0.0196,0.0775]
	(AME = -1.4458)		(AME = -0.7779)		(AME = -0.3046)		(AME = 0.0794)		(AME = 0.0875)		(AME = 0.0449)	
CCNC Early Adopter	1.05	[0.93,1.19]	0.95	[0.89,1.01]	0.97	[0.92,1.02]	0.0279	[-0.0123,0.0681]	0.0107	[-0.0094,0.0308]	0.008	[-0.0112,0.0273]
Person-level controls												
Age	0.97**	[0.95,0.99]	0.97***	[0.96,0.97]	1.00	[0.99,1.00]	0.0074	[-0.0071,0.0219]	0.0172***	[0.0096,0.0247]	0.0095***	[0.0042,0.0148]
Age^2	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	1.00**	[1.00,1.00]	-0.0001	[-0.0002,0.0001]	-0.0002***	[-0.0003,-0.0001]	-0.0001***	[-0.0002,-0.0001]
Male	0.75***	[0.72,0.78]	0.74***	[0.72,0.75]	0.75***	[0.74,0.76]	0.0661***	[0.0369,0.0952]	0.0828***	[0.0676,0.0980]	0.0672***	[0.0543,0.0802]
Charlson Index	1.41***	[1.38,1.45]	1.44***	[1.42,1.46]	1.48***	[1.46,1.49]	-0.0495***	[-0.0686,-0.0304]	-0.0545***	[-0.0659,-0.0432]	-0.0430***	[-0.0530,-0.0330]
Charlson Index^2	0.98***	[0.98,0.98]	0.98***	[0.98,0.98]	0.98***	[0.98,0.98]	0.0014	[-0.0006,0.0034]	0.0026***	[0.0012,0.0040]	0.0025***	[0.0016,0.0034]
Eligibility (omitted = subscriber)												
Spouse	1.12***	[1.06,1.19]	1.06***	[1.03,1.09]	1.15***	[1.13,1.17]	0.0081	[-0.0385,0.0548]	-0.0266*	[-0.0510,-0.0021]	-0.0315***	[-0.0474,-0.0156]
Other	1.48	[0.89,2.47	0.53***	[0.44,0.64]	0.96	[0.87,1.07]	-0.1598*	[-0.3030,-0.0165]	0.028	[-0.1151,0.1710]	-0.0058	[-0.0926,0.0809]
Plan Type (omitted = CMM)												
Smart Choice	1.12*	[1.01,1.24]	0.94**	[0.89,0.98]	0.98	[0.95,1.01]	0.0287	[-0.0368,0.0943]	-0.0218	[-0.0593,0.0156]	0.0012	[-0.0240,0.0264]
Smart Choice Basic	1.04	[0.94,1.15]	0.84***	[0.80,0.87]	0.89***	[0.86,0.91]	0.0462	[-0.0299,0.1223]	0.022	[-0.0175,0.0615]	0.0222	[-0.0046,0.0491]
Smart Choice Plus	1.49***	[1.32,1.68]	1.13***	[1.07,1.20]	1.11***	[1.07,1.15]	0.0238	[-0.0721,0.1197]	-0.0533*	[-0.1038,-0.0029]	-0.0185	[-0.0491,0.0122]
Practice and county-level controls												
# Primary Care Providers	—	—	0.98	[0.96,1.00]	1.00	[1.00,1.00]	—	—	-0.0067	[-0.0176,0.0041]	-0.0002	[-0.0008,0.0004]
Multisite Practice	—	—	1.35*	[1.02,1.80]	0.88	[0.68,1.14]	—	—	-0.0718	[-0.1717,0.0280]	0.1021**	[0.0367,0.1675]
Rural-Urban												
Non-urban, Non-rural	0.85*	[0.73,0.98]	0.91**	[0.85,0.97]	0.94*	[0.88,1.00]	0.0023	[-0.0435,0.0480]	0.0118	[-0.0105,0.0341]	0.0351**	[0.0102,0.0600]
Rural	0.76*	[0.59,0.99]	0.91	[0.79,1.03]	0.82**	[0.73,0.93]	0.0409	[-0.0540,0.1357]	0.0366	[-0.0076,0.0809]	0.0564*	[0.0050,0.1079]
Community-based Practice	1.04	[0.78,1.40]	1.09	[0.94,1.27]	1.01	[0.93,1.09]	-0.0211	[-0.1079,0.0658]	-0.0306	[-0.0890,0.0279]	0.0052	[-0.0305,0.0410]
County Proportion Poverty	11.97***	[3.08,46.56]	0.92	[0.49,1.75]	1.13	[0.70,1.83]	-0.4902	[-1.0071,0.0268]	-0.0133	[-0.3115,0.2849]	0.1201	[-0.1319,0.3720]
Primary Care Providers/10,000 Population	1.01	[0.99,1.03]	1.00	[0.99,1.01]	0.99**	[0.99,1.00]	0.0058	[-0.0017,0.0133]	0.0007	[-0.0024,0.0037]	0.0002	[-0.0018,0.0023]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.58*	[0.37,0.92]	1.02	[0.83,1.24]	0.93	[0.80,1.09]	0.1081	[-0.0671,0.2832]	0.0006	[-0.0797,0.0809]	0.0313	[-0.0298,0.0925]
Hispanic	0.68	[0.30,1.52]	0.69*	[0.48,0.99]	0.93	[0.65,1.34]	0.4660**	[0.1846,0.7475]	0.023	[-0.1052,0.1512]	0.0123	[-0.1389,0.1635]
Year												
2005	1.56*	[1.06,2.29]	0.99	[0.87,1.12]	1.02	[0.97,1.06]	-0.0161	[-0.2915,0.2594]	-0.0951**	[-0.1590,-0.0312]	-0.0330**	[-0.0540,-0.0119]
2006	1.60*	[1.09,2.35]	1.00	[0.89,1.14]	1.03	[0.98,1.07]	-0.0046	[-0.2735,0.2643]	-0.0861**	[-0.1497,-0.0224]	-0.0406***	[-0.0608,-0.0203]
2007	1.88**	[1.28,2.76]	1.05	[0.92,1.19]	1.07**	[1.02,1.12]	-0.0431	[-0.3153,0.2291]	-0.1131***	[-0.1761,-0.0502]	-0.0605***	[-0.0797,-0.0412]
2008	1.90***	[1.30,2.79]	1.05	[0.93,1.19]	1.08***	[1.04,1.13]	-0.0503	[-0.3191,0.2185]	-0.1190***	[-0.1826,-0.0554]	-0.0678***	[-0.0880,-0.0477]
Constant	2.75**	[1.34,5.66]	11.45***	[8.30,15.79]	4.53***	[3.70,5.56]	0.3018	[-0.1425,0.7461]	0.2416*	[0.0229,0.4603]	0.2473***	[0.1161,0.3786]
Average practice intercept	0.31***	[0.27,0.37]	0.27***	[0.25,0.30]	0.18***	[0.16,0.20]	-2.7246***	[-3.0750,-2.3742]	-2.7958***	[-2.9569,-2.6347]	-2.9092***	[-3.0558,-2.7625]
N	2139		9050		18500		1838		7652		15643	

Notes : PCP is primary care provider. Logit models used for IP and ED visits. Zero-truncated Poisson with reintroduced zeros used for PCP and OP vists. Robust OLS used for Continuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.14b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed-Effects Models, by Practice Size

	>=1 IP			>=1 ED			#PCP			#OP			COC		
	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)
CCNC Patients (omitted=Very Low)															
Low															
MLM AME	- 0.041**	0.003	- 0.0087	- 0.002	0.011	- 0.004	- 0.10	- 0.05	- 0.12	- 0.557	- 0.492*	- 0.06	- 0.000	0.051**	0.0223
	[-0.065,-0.017]	[-0.018,0.024]	[-0.028,0.011]	[-0.043,0.039]	[-0.025,0.046]	[-0.036,0.027]	[-0.53,0.34]	[-0.36,0.26]	[-0.39,0.15]	[-1.144,0.032]	[-0.904,-0.081]	[-0.41,0.29]	[-0.039,0.039]	[0.021,0.081]	[-0.0095,0.0541]
FE AME	- 0.0472*	0.0213	0.0026	- 0.0628	- 0.0350	- 0.0197	0.08	0.398	- 0.15	- 0.60	0.47	0.10	0.049	0.034	0.018
	[-0.0924,-0.0019]	[-0.0316,0.0743]	[-0.0525,0.0577]	[-0.1426,0.0170]	[-0.1046,0.0347]	[-0.0825,0.0432]	[-0.83,0.99]	[-0.060,0.856]	[-0.42 ,0.12]	[-1.97,0.77]	[-0.33,1.27]	[-0.62,0.82]	[-0.018,0.115]	[-0.050,0.118]	[-0.033,0.069]
Medium															
MLM AME	- 0.007	- 0.003	0.003	0.022	0.0285	- 0.007	- 0.37	- 0.218	0.05	- 0.640	- 0.75**	- 0.12	- 0.019	0.063**	0.045**
	[-0.047,0.032]	[-0.021,0.015]	[-0.018,0.023]	[-0.032,0.076]	[-0.0056,0.0626]	[-0.037,0.022]	[-0.88,0.15]	[-0.509,0.072]	[-0.25,0.34]	[-1.371,0.091]	[-1.14,-0.35]	[-0.48,0.25]	[-0.071,0.032]	[0.035,0.091]	[0.014,0.075]
FE AME	- 0.0012	0.0705*	0.0196	- 0.1477*	0.0206	- 0.0328	- 0.48	0.36	0.02	- 0.86	0.58	0.19	0.054	0.028	0.013
	[-0.1015,0.0991]	[0.0064,0.1346]	[-0.0459,0.0851]	[-0.2716,-0.0238]	[-0.0666,0.1078]	[-0.1081,0.0426]	[-1.85,0.89]	[-0.35,1.07]	[-0.36,0.39]	[-3.12,1.40]	[-0.44,1.61]	[-0.67,1.04]	[-0.052,0.161]	[-0.060,0.117]	[-0.050,0.075]
High															
MLM AME	0.024	0.000	0.010	0.043	0.030	0.013	- 0.68	- 0.375	0.01	- 1.339*	- 0.86**	- 0.13	0.075	0.086**	0.0348
	[-0.065,0.113]	[-0.029,0.030]	[-0.019,0.039]	[-0.077,0.162]	[-0.023,0.082]	[-0.029,0.055]	[-1.60,0.25]	[-0.785,0.036]	[-0.38,0.40]	[-2.650,-0.028]	[-1.44,-0.29]	[-0.62,0.36]	[-0.023,0.172]	[0.044,0.128]	[-0.0047,0.0742]
FE AME	0.0729	0.0440	0.0211	- 0.3214**	- 0.0068	- 0.0300	- 1.61	0.09	- 0.05	- 1.41	0.53	0.25	- 0.01	0.00	- 0.010
	[-0.0617,0.2074]	[-0.0321,0.1201]	[-0.0491,0.0913]	[-0.5350,-0.1078]	[-0.1166,0.1030]	[-0.1121,0.0522]	[-3.59,0.37]	[-0.69,0.87]	[-0.55,0.44]	[-4.69,1.87]	[-0.66,1.72]	[-0.69,1.18]	[-0.23,0.21]	[-0.10,0.10]	[-0.078,0.059]
Very High															
MLM AME	- 0.067*	- 0.0268*	- 0.002	0.061	0.0393	0.023	- 0.45	- 0.25	0.030	- 1.45*	- 0.78**	- 0.30	0.079	0.088**	0.0449*
	[-0.119,-0.015]	[-0.0478,-0.0058]	[-0.025,0.020]	[-0.053,0.174]	[-0.0085,0.0871]	[-0.014,0.061]	[-1.32,0.41]	[-0.65,0.16]	[-0.340.40]	[-2.60,-0.29]	[-1.34,-0.21]	[-0.75,0.14]	[-0.013,0.171]	[0.049,0.126]	[0.0098,0.0800]
FE AME	- 0.0353	0.0411	0.0183	- 0.3046**	0.0078	-0.0509	- 1.39	0.19	- 0.01	- 1.81	0.67	0.19	0.03	0.018	- 0.010
	[-0.1890,0.1183]	[-0.0424,0.1246]	[-0.0525,0.0891]	[-0.4872,-0.1221]	[-0.1193,0.1348]	[-0.1355,0.0338]	[-3.23,0.45]	[-0.71,1.09]	[-0.54,0.52]	[-5.31,1.70]	[-0.68,2.02]	[-0.84,1.22]	[-0.18,0.25]	[-0.090,0.126]	[-0.082,0.062]

Notes: For multi-level models: logit models used for IP and ED visits, zero-truncated Poisson with reintroduced zeros used for PCP and OP vists, robust OLS used for Continuity of Care. For fixed-effects models: Cluster-robust LPMs used for IP and ED visits, OLS used for PCP and OP visits and Contintinuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.15a: Multi-Level Estimates of the Effect of CCNC on SHP Paid Medical Expenditures, by Practice Size

	Total						IP						ED					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI	Coef.	95% CI	OR	95%	OR	95%	OR	95%
CCNC	557.58	[-1682.00,2797.17]	332.42	[-674.40,1339.24]	59.54	[-923.24,1042.32]	158.88	[-1164.44,1482.20]	232.35	[-364.50,829.19]	-355.70	[-966.00,254.59]	-20.69	[-168.17,126.80]	27.52	[-56.08,111.11]	9.94	[-72.16,92.04]
	(AME = 557.58)		(AME = 332.42)		(AME = 59.54)		(AME = 158.88)		(AME = 232.35)		(AME = -355.71)		(AME = -20.69)		(AME = 27.52)		(AME = 9.94)	
Ever CCNC	-1373.95	[-3699.85,951.94]	-547.30	[-1604.12,509.53]	-330.45	[-1447.69,786.78]	-671.87	[-1942.63,598.90]	72.91	[-519.10,664.92]	311.94	[-314.08,937.95]	-21.71	[-164.01,120.59]	-4.46	[-89.67,80.76]	33.86	[-52.96,120.68]
CCNC Early Adopter	1513.60	[-677.12,3704.32]	-140.34	[-987.14,706.47]	330.45	[-518.11,1179.00]	766.34	[-272.97,1805.66]	-332.02	[-771.84,107.80]	294.17	[-108.42,696.76]	135.12*	[17.50,252.73]	60.38	[-5.33,126.09]	13.16	[-46.14,72.47]
Person-level controls																		
Age	205.87	[-265.98,677.72]	-44.54	[-300.29,211.21]	-12.29	[-224.20,199.62]	-62.41	[-360.53,235.72]	-91.93	[-255.21,71.35]	-113.92	[-252.86,25.02]	-10.37	[-43.38,22.64]	4.35	[-17.62,26.32]	-3.46	[-21.75,14.84]
Age^2	-2.05	[-7.08,2.98]	0.57	[-2.17,3.31]	0.32	[-1.95,2.59]	0.95	[-2.23,4.13]	1.03	[-0.72,2.78]	1.25	[-0.24,2.74]	0.05	[-0.30,0.40]	0.13	[-0.36,0.11]	-0.05	[-0.25,0.14]
Male	-402.85	[-1275.88,470.18]	-343.62	[-815.34,128.10]	-110.42	[-511.69,290.85]	266.08	[-278.48,810.63]	183.21	[-116.50,482.92]	359.05**	[96.64,621.46]	-22.54	[-82.91,37.82]	-71.35***	[-111.78,-30.91]	-68.21***	[-102.79,-33.62]
Charlson Index	5661.73***	[4923.69,6399.77]	4544.32***	[4119.92,4968.71]	5344.23***	[4997.13,5691.32]	2986.09***	[2520.05,3452.14]	1912.99***	[1642.33,2183.65]	1965.48***	[1738.16,2192.81]	257.24***	[205.63,308.84]	288.59***	[252.15,325.03]	323.63***	[293.69,353.58]
Charlson Index^2	342.08***	[246.85,437.31]	473.54***	[416.39,530.68]	460.52***	[416.59,504.46]	-45.92	[-106.13,14.29]	115.83***	[79.33,152.33]	201.94***	[173.11,230.77]	-5.13	[-11.80,1.53]	-10.07***	[-14.97,-5.16]	-11.88***	[-15.68,-8.09]
Eligibility (omitted = subscriber)																		
Spouse	5176.16***	[3874.71,6477.60]	3691.20***	[2950.81,4431.59]	1674.38***	[1061.40,2287.37]	1039.35*	[223.16,1855.54]	944.66***	[472.68,1416.64]	369.57	[-31.69,770.83]	11.87	[-78.55,102.30]	141.60***	[78.05,205.15]	21.08	[-31.78,73.95]
Other	6119.56	[-2791.88,15031.00]	1528.16	[-3061.25,6117.56]	-2351.28	[-5456.44,753.89]	3349.23	[-2276.74,8975.20]	863.08	[-2069.52,3795.69]	-2006.57	[-4044.19,31.04]	-313.44	[-936.32,309.45]	266.67	[-127.66,661.00]	-14.16	[-282.33,254.01]
Plan Type (omitted = CMM)																		
Smart Choice	-1812.84	[-3894.35,268.67]	-1999.51**	[-3203.61,-795.41]	-894.02	[-1913.57,125.53]	-1402.51*	[-2713.90,-91.12	-1406.41***	[-2176.11,-636.70]	-1086.61**	[-1755.18,-418.03]	-192.10**	[-337.33,-46.87]	-73.60	[-177.10,29.89]	-63.43	[-151.45,24.59]
Smart Choice Basic	-2767.77*	[-4924.63,-610.92]	-3275.54***	[-4513.29,-2037.78]	-2158.70***	[-3213.21,-1104.19]	-1257.07	[-2615.87,101.73]	-1844.58***	[-2636.24,-1052.92]	-1471.50***	[-2163.06,-779.94]	-129.91	[-280.39,20.57]	-41.20	[-147.61,65.22]	-16.55	[-107.60,74.49]
Smart Choice Plus	3793.64**	[1114.46,6472.82]	2289.45**	[726.92,3851.99]	2583.33***	[1295.97,3870.70]	1445.25	[-245.00,3135.50]	277.47	[-721.34,1276.28]	-28.24	[-872.60,816.12]	-207.40*	[-394.57,-20.23]	138.55*	[4.25,272.85]	114.37*	[3.22,225.52]
Practice and county-level controls																		
# Primary Care Providers	–	–	109.93	[-258.71,478.57]	19.67	[-9.04,48.37]	–	–	39.98	[-169.20,249.15]	12.89	[-0.88,26.66]	–	–	11.32	[-18.60,41.25]	3.34**	[1.27,5.42]
Multisite Practice	–	–	-252.26	[-3718.43,3213.91]	-1238.38	[-5024.94,2548.18]	–	–	-455.66	[-2174.91,1263.59]	-467.75	[-2249.35,1313.86]	–	–	39.72	[-223.37,302.81]	-151.96	[-413.00,109.08]
Rural-Urban																		
Non-urban, Non-rural	1065.98	[-397.58,2529.54]	188.79	[-547.59,925.18]	129.50	[-744.13,1003.14]	486.72	[-239.78,1213.21]	176.99	[-206.29,560.27]	258.55	[-157.87,674.96]	55.54	[-26.38,137.46]	22.62	[-34.61,79.84]	72.28*	[10.91,133.65]
Rural	-1285.16	[-5023.31,2452.98]	-348.86	[-2032.76,1335.03]	-1553.22	[-3502.65,396.20]	-948.40	[-2925.88,1029.08]	392.06	[-516.24,1300.36]	-585.79	[-1628.24,456.66]	-36.02	[-257.58,185.55]	-121.70	[-254.52,11.11]	9.83	[-136.42,156.07]
Community-based Practice	749.13	[-2584.97,4083.24]	-2352.47***	[-3687.48,-1017.45]	-1552.10**	[-2544.97,-559.23]	43.77	[-1570.78,1658.33]	-65.83	[-742.08,610.43]	-377.24	[-838.47,83.99]	-108.61	[-291.73,74.50]	36.11	[-66.64,138.86]	24.67	[-44.25,93.59]
County Proportion Poverty	545.68	[-17566.81,18658.17]	-5339.30	[-14385.70,3707.10]	-11613.78*	[-21249.45,-1978.10]	2073.32	[-7178.49,11325.14]	929.56	[-3852.71,5711.83]	89.36	[-4666.69,4845.41]	-1679.86**	[-2721.03,-638.69]	-376.24	[-1084.97,332.48]	-1504.73***	[-2200.10,-809.36]
Primary Care Providers/10,000 Population	-34.30	[-210.19,141.60]	-43.47	[-117.98,31.03]	-21.30	[-79.00,36.40]	-2.64	[-94.33,89.05]	-3.13	[-41.00,34.73]	3.41	[-24.29,31.11]	2.34	[-7.95,12.63]	-3.82	[-9.54,1.91]	0.27	[-3.79,4.34]
County Proportion Race/Ethnicity																		
Non-white, not Hispanic	-589.77	[-5497.76,4318.22]	-719.71	[-3222.63,1783.21]	142.29	[-2297.80,2582.38]	-881.04	[-3391.04,1628.95]	-658.26	[-1987.54,671.02]	34.44	[-1204.19,1273.06]	282.76*	[0.49,565.02]	132.28	[-64.01,328.57]	357.72***	[179.95,535.49]
Hispanic	5168.29	[-3708.99,14045.57]	-3624.86	[-8115.82,866.10]	-5955.56*	[-11344.21,-566.91]	1954.00	[-2474.15,6382.14]	-883.43	[-3253.55,1486.68]	-1556.31	[-4169.98,1057.37]	186.79	[-312.15,685.73]	95.53	[-255.72,446.77]	151.72	[-230.26,533.70]
Year																		
2005	999.97	[-843.66,2843.60]	726.97	[-383.69,1837.63]	1509.16**	[599.84,2418.49]	288.37	[-839.40,1416.14]	-178.00	[-873.73,517.73]	161.67	[-419.15,742.49]	243.68***	[118.48,368.88]	117.81*	[23.32,212.30]	160.37***	[83.25,237.49]
2006	1881.39*	[56.70,3706.08]	1286.40*	[185.26,2387.55]	1820.12***	[913.93,2726.32]	301.02	[-810.88,1412.91]	-207.87	[-894.64,478.90]	323.83	[-252.80,900.45]	261.20***	[137.73,384.66]	134.89**	[41.40,228.39]	154.63***	[77.97,231.29]
2007	1488.81	[-303.32,3280.93]	1286.78*	[197.52,2376.05]	1994.27***	[1081.41,2907.13]	326.15	[-759.31,1411.61]	-372.65	[-1050.16,304.85]	332.87	[-244.62,910.37]	236.94***	[116.34,357.55]	166.41***	[74.04,258.78]	167.73***	[90.81,244.65]
2008	2006.71*	[184.61,3828.80]	1751.46**	[654.40,2848.52]	2296.55***	[1389.26,3203.84]	766.03	[-331.63,1863.69]	-137.73	[-815.25,539.79]	418.69	[-155.94,993.32]	289.08***	[167.09,411.08]	208.21***	[115.51,300.91]	226.57***	[150.06,303.09]
Constant	-6745.98	[-18662.99,5171.04]	6021.71	[-387.69,12431.11]	2651.53	[-2638.93,7941.99]	-1000.74	[-8326.20,6324.73]	2410.3	[-1612.87,6433.47]	2055.27	[-1327.32,5437.85]	525.96	[-286.72,1338.64]	-68.21	[-613.82,477.40]	116.87	[-331.78,565.51]
Average practice intercept	8.32***	[8.13,8.51]	7.73***	[7.55,7.92]	7.60***	[7.42,7.79]	6.93***	[6.06,7.80]	6.14***	[5.23,7.06]	6.26***	[5.92,6.59]	4.85***	[4.38,5.33]	4.92***	[4.70,5.14]	4.66***	[4.42,4.89]
N	7850		20393		35070		7850		20393		35070		7850		20393		35070	

Notes: PCP is primary care provider. Bootstrapped OLS models used for all outcomes.

*p<0.05, **p<0.01, ***p<0.001

Table 5.15a: Continued

	OP						RX					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	OR	95%	OR	95%	OR	95%	OR	95%	OR	95%	OR	95%
CCNC	284.20	[-1123.43,1691.84]	226.68	[-422.90,876.25	217.24	[-411.24,845.72]	-40.09	[-394.15,313.98]	-141.49	[-316.23,33.24]	27.73	[-134.88,190.33]
	(AME = 284.20)		(AME = 226.68)		(AME = 217.24)		(AME = -40.09)		(AME = -141.49)		(AME = 27.73)	
Ever CCNC	-728.84	[-2206.26,748.59]	-482.44	[-1177.02,212.14]	-733.21	[-1728.07,261.64]	147.62	[-242.21,537.44]	-98.71	[-299.53,102.11]	-38.96	[-237.53,159.61]
CCNC Early Adopter	555.47	[-856.61,1967.55]	233.03	[-336.37,802.43]	68.26	[-881.91,1018.42]	-17.82	[-412.30,376.65]	-116.91	[-294.66,60.84]	-230.52**	[-393.05,-67.99]
Person-level controls												
Age	170.82	[-124.18,465.82]	-36.71	[-198.86,125.44]	-21.40	[-149.89,107.10]	134.09***	[61.29,206.90]	89.02***	[47.45,130.59]	136.92***	[102.54,171.31]
Age^2	-1.97	[-5.12,1.17]	0.50	[-1.24,2.23]	0.43	[-0.95,1.80]	-1.37***	[-2.14,-0.59]	-0.92***	[-1.36,-0.47]	-1.42***	[-1.79,-1.05]
Male	-724.26**	[-1270.71,-177.81]	-495.36**	[-794.75,-195.96]	-541.38***	[-785.28,-297.48]	91.98	[-43.45,227.41]	55.47	[-21.50,132.43]	140.63***	[75.46,205.80]
Charlson Index	1575.69***	[1114.22,2037.15]	1675.33***	[1406.20,1944.46	2247.86***	[2037.24,2458.48]	785.94***	[672.02,899.86]	654.91***	[585.87,723.95]	772.25***	[715.91,828.58]
Charlson Index^2	431.45***	[371.90,490.99]	377.15***	[340.92,413.38]	287.73***	[261.11,314.35]	-35.34***	[-50.03,-20.64]	-9.30*	[-18.59,-0.01]	-18.47***	[-25.60,-11.34]
Eligibility (omitted = subscriber)												
Spouse	2939.31***	[2125.04,3753.57]	1776.93***	[1307.32,2246.54]	358.42	[-14.01,730.85]	1178.50***	[977.00,1380.01]	812.37***	[691.81,932.92]	888.91***	[789.38,988.44]
Other	106.01	[-5467.16,5679.18]	-89.10	[-2998.61,2820.41]	-1558.65	[-3444.42,327.12]	3243.74***	[1866.20,4621.28	652.96	[-92.98,1398.90]	1369.00***	[865.16,1872.83]
Plan Type (omitted = CMM)												
Smart Choice	-351.90	[-1653.72,949.91]	-663.95	[-1427.09,99.20]	276.81	[-341.58,895.19]	164.14	[-157.58,485.86]	166.62	[-28.82,362.06]	-4.29	[-169.72,161.15]
Smart Choice Basic	-1253.68	[-2602.63,95.27]	-1403.53***	[-2187.91,-619.16]	-323.88	[-963.39,315.63]	-82.17	[-415.55,251.21]	56.88	[-143.92,257.68]	-322.15***	[-493.25,-151.05]
Smart Choice Plus	1479.96	[-195.43,3155.34]	900.43	[-89.89,1890.74]	2158.23***	[1377.77,2938.68]	991.56***	[577.74,1405.38]	1050.49***	[796.87,1304.10]	346.18**	[137.32,555.04]
Practice and county-level controls												
# Primary Care Providers	—	—	49.55	[-191.54,290.64]	6.18	[-16.26,28.62]	—	—	11.21	[-56.64,79.07]	6.61*	[1.48,11.75]
Multisite Practice	—	—	-302.43	[-2661.16,2056.29]	-14410.08	[-6015.59,3133.43]	—	—	371.70	[-391.09,1134.50]	406.55	[-333.30,1146.40]
Rural-Urban												
Non-urban, Non-rural	391.31	[-547.73,1330.35]	81.77	[-412.81,576.35]	189.85	[-748.30,1127.99]	148.55	[-108.99,406.08]	-97.56	[-251.06,55.94]	-121.05	[-287.05,44.95]
Rural	188.15	[-2198.94,2575.23]	-505.04	[-1628.39,618.31]	-181.77	[-2135.74,1772.21]	-225.80	[-869.68,418.08]	-104.90	[-448.41,238.61]	-487.05**	[-845.56,-128.55]
Community-based Practice	316.51	[-1819.33,2452.34]	-2361.66***	[-3261.69,-1461.63]	-2049.42***	[-3140.37,-958.47]	410.24	[-169.68,990.17]	-253.46	[-535.01,28.08]	-5.34	[-195.19,184.51]
County Proportion Poverty	-286.37	[-11864.78,11292.04]	-5090.15	[-11132.09,951.80]	-10975.60*	[-19761.06,-2190.14]	-827.83	[-3949.98,2294.31]	-324.85	[-2153.47,1503.77]	-296.30	[-2071.74,1479.15]
Primary Care Providers/10,000 Population	-70.63	[-183.06,41.79]	-34.09	[-84.44,16.25]	-13.93	[-76.55,48.69]	16.19	[-14.22,46.61]	6.75	[-9.14,22.63]	-9.73	[-20.72,1.26]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	959.96	[-2180.88,4100.79]	-53.13	[-1725.88,1619.61]	826.27	[-1631.47,3284.00]	-647.36	[-1500.33,205.61]	-348.59	[-859.55,162.37]	-805.75***	[-1259.69,-351.81]
Hispanic	2869.72	[-2825.49,8564.93]	-3180.74*	[-6187.61,-173.86]	-3702.61	[-9366.93,1961.71]	480.76	[-1081.26,2042.78]	378.58	[-547.69,1304.85]	-1540.71**	[-2559.87,-521.56]
Year												
2005	52.50	[-1104.21,1209.20]	429.03	[-279.26,1137.32]	806.40**	[218.58,1394.21]	504.41***	[214.67,794.14]	331.16***	[145.71,516.61]	468.42***	[318.55,618.29]
2006	911.86	[-233.46,2057.19]	841.55*	[138.66,1544.45]	802.93**	[210.57,1395.29]	527.72***	[240.33,815.11]	458.12***	[273.66,642.58]	630.90***	[481.21,780.59]
2007	356.17	[-769.23,1481.57]	812.06*	[116.24,1507.89]	800.33**	[194.36,1406.31]	687.30***	[404.45,970.15]	653.43***	[470.39,836.47]	775.06***	[623.75,926.38]
2008	448.51	[-696.47,1593.48]	1021.73**	[319.51,1723.95]	989.10**	[389.83,1588.38]	639.14***	[350.60,927.68]	643.60***	[457.70,829.50]	750.05***	[599.81,900.29]
Constant	-3145.88	[-10621.05,4329.29]	5001.00*	[913.53,9088.47]	3562.87*	[26.26,7099.48]	-3489.07***	[-5360.65,-1617.49]	-1409.79*	[-2482.53,-337.05]	-2200.60**	[-3075.23,-1325.98]
Average practice intercept	7.91***	[7.76,8.07]	7.43***	[7.28,7.59]	8.02***	[7.88,8.16]	6.74***	[6.63,6.86]	6.49***	[6.39,6.59]	6.07***	[5.95,6.20]
N	7850		20393		35070		7850		20393		35070	

Notes: PCP is primary care provider. Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.15b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models

	Total			IP			ED			OP			RX		
	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)
CCNC															
MLM AME	557.58	332.42	59.54	158.88	232.35	- 355.71	- 20.69	27.52	9.94	284.20	226.68	217.24	- 40.09	- 141.49	27.73
	[-1696.34,2811.50]	[-680.85,1345.69]	[-929.53,1048.61]	[-1172.91,1490.67]	[-368.32,833.02]	[-969.92,258.50]	[-169.12,127.74]	[-56.61,111.65]	[-72.69,92.57]	[-1132.44,1700.84]	[-427.05,880.41]	[-415.27,849.75]	[-396.42,316.24]	[-317.34,34.36]	[-135.91,191.37]
FE AME	1030.84	397.99	- 91.65	334.03	181.15	- 290.55	43.57	44.23	34.03	700.29	305.60	133.11	- 47.05	- 132.99	31.58
	[-1115.84,3177.53]	[-1246.27,2042.25]	[-965.29,782.00]	[-945.38,1613.45]	[-1100.77,1463.08]	[-889.78,308.69]	[-120.92,208.06]	[-43.28,131.73]	[-30.76,98.82]	[-705.02,2105.61]	[-356.37,967.58	[-359.15,625.37]	[-479.27,385.16]	[-316.15,50.18]	[-126.97,190.12]

Notes: Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.16a: Multi-Level Estimates of the Moderating Effect of CCNC Patient Load on SHP Paid Medical Expenditures, by Practice Size

	Total						IP						ED					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI
CCNC Patients (omitted = Very Low)																		
Low	-3069.63**	[-4939.42,-1199.85]	-1109.77	[-2411.39,191.86]	667.73	[-988.03,2323.49]	-1409.39**	[-2351.04,-467.75]	58.34	[-750.31,866.99]	768.26	[-181.68,1718.19]	25.99	[-100.26,152.24]	25.90	[-107.58,159.37]	3.40	[-121.86,128.66]
	(AME = -3069.64)		(AME = -1109.77)		(AME = 667.73)		(AME = -1409.40)		(AME = 58.34)		(AME = 768.26)		(AME = 25.99)		(AME = 25.90)		(AME = 3.40)	
Medium	-3639.18**	[-6320.14,-958.23]	-1109.03	[-2430.29,212.24]	187.15	[-1560.31,1934.62]	-1166.54	[-2524.03,190.96]	290.73	[-528.74,1110.19]	1052.50*	[50.63,2054.36]	25.22	[-157.12,207.56]	60.70	[-75.35,196.74]	-80.42	[-212.47,51.63]
	(AME = -3639.18)		(AME = -1109.03)		(AME = 187.15)		(AME = -1166.54)		(AME = 290.73)		(AME = 1052.50)		(AME = 25.22)		(AME = 60.70)		(AME = -80.42)	
High	-3724.44	[-7826.63,377.75]	-1045.98	[-2613.92,521.95]	1041.90	[-714.65,2798.45]	-389.02	[-2453.47,1675.44]	268.44	[-703.21,1240.10]	1431.01**	[425.58,2436.44]	85.02	[-191.39,361.42]	60.42	[-100.78,221.61]	-14.59	[-147.13,117.96]
	(AME = -3724.44)		(AME = -1045.98)		(AME = 1041.90)		(AME = -389.02)		(AME = 268.44)		(AME = 1431.01)		(AME = 85.02)		(AME = 60.42)		(AME = -14.59)	
Very High	-1712.32	[-5956.48,2531.83]	-2187.43**	[-3702.77,-672.09]	-141.47	[-1806.02,1523.08]	-859.72	[-3019.05,1299.61]	-357.49	[-1297.66,582.68]	904.73	[-42.21,1851.68]	418.28**	[128.00,708.57]	28.91	[-127.04,184.87]	-7.03	[-131.91,117.85]
	(AME = -1712.33)		(AME = -2187.43)		(AME = -141.47)		(AME = -859.72)		(AME = -357.49)		(AME = 904.73)		(AME = 418.28)		(AME = 28.91)		(AME = -7.03)	
CCNC Early Adopter	577.65	[-1168.39,2323.69]	222.43	[-578.59,1023.45]	193.83	[-678.56,1066.21]	842.68	[-21.24,1706.60]	-240.11	[-734.37,254.14]	228.90	[-217.53,675.32]	132.80*	[17.57,248.03]	57.90	[-25.61,141.41]	-1.02	[-60.32,58.28]
Person-level controls																		
Age	-196.98	[-998.41,604.46]	-110.62	[-504.26,283.02]	31.51	[-275.29,338.32]	78.02	[-356.34,512.38]	-134.15	[-386.99,118.70]	-58.46	[-258.67,141.75]	16.06	[-43.41,75.53]	7.81	[-29.96,45.58]	-3.26	[-29.46,22.94]
Age^2	2.67	[-5.96,11.31]	1.20	[-3.02,5.43]	-0.26	[-3.55,3.03]	-1.01	[-5.69,3.67]	1.42	[-1.30,4.13]	0.59	[-1.56,2.74]	-0.18	[-0.82,0.46]	- 0.2	[-0.61,0.20]	-0.06	[-0.34,0.22]
Male	-764.48	[-2274.84,745.89]	-413.75	[-1141.44,313.95]	-122.75	[-714.95,469.44]	-95.7	[-912.53,721.14]	182.41	[-284.42,649.25]	449.75*	[63.96,835.55]	-24.15	[-135.92,87.62]	-76.51*	[-146.50,-6.53]	-73.21**	[-123.70,-22.72]
Charlson Index	5636.03***	[4339.05,6933.02]	4391.97***	[3719.07,5064.86]	6011.78***	[5524.35,6499.21]	2663.40***	[1959.48,3367.32]	1484.75***	[1052.58,1916.93]	2082.31***	[1764.45,2400.17]	212.68***	[116.25,309.10]	317.78***	[253.21,382.35]	333.68***	[292.08,375.28]
Charlson Index^2	405.51***	[236.92,574.09]	555.85***	[460.31,651.39]	342.77***	[283.80,401.75]	58.41	[-33.11,149.94]	221.65***	[160.26,283.05]	165.07***	[126.56,203.58]	6.17	[-6.37,18.71]	-4.71	[-13.87,4.45]	-11.53***	[-16.57,-6.50]
Eligibility (omitted = subscriber)																		
Spouse	6459.38***	[4053.36,8865.40]	5078.63***	[3896.74,6260.51]	2052.64***	[1143.69,2961.59]	2461.50***	[1159.96,3763.05]	1576.46***	[817.75,2335.18]	504.45	[-87.94,1096.85]	64.36	[-113.75,242.47]	284.74***	[171.21,398.27]	-28.82	[-106.35,48.71]
Other	-1211.00	[-21630.83,19208.82]	-396.95	[-7328.88,6534.98]	-3240.06	[-7790.43,1310.31]	-712.77	[-11785.49,10359.96]	-68.31	[-4521.41,4384.79]	-2340.89	[-5313.80,632.02]	-164.12	[-1680.81,1352.56]	82.73	[-582.42,747.89]	- 6.18	[-395.20,382.84]
Plan Type (omitted = CMM)																		
Smart Choice	1911.98	[-2088.59,5912.55]	-2281.81*	[-4294.18,-269.43]	-1182.66	[-2796.35,431.02]	-228.50	[-2394.70,1937.71]	-2115.86**	[-3408.44,-823.28]	-1197.22*	[-2250.75,-143.69]	-122.31	[-418.85,174.23]	-146.96	[-340.03,46.11]	-92.28	[-230.14,45.59]
Smart Choice Basic	738.91	[-3344.73,4822.55]	-3376.28**	[-5422.39,-1330.17]	-2470.83**	[-4126.79,-814.87]	-704.23	[-2915.21,1506.74]	-2570.64***	[-3885.12,-1256.16]	-1649.53**	[-2730.51,-568.54]	-104.77	[-407.43,197.90]	-80.32	[-276.57,115.92]	-47.87	[-189.33,93.59]
Smart Choice Plus	7881.77**	[2707.06,13056.48]	3976.97**	[1397.76,6556.19]	2540.84*	[565.67,4516.01]	1261.02	[-1541.38,4063.42]	1259.84	[-396.61,2916.29]	-96.94	[-1386.20,1192.32]	82.88	[-300.75,466.52]	142.46	[-105.07,389.98]	150.32	[-18.40,319.04]
Practice and county-level controls																		
# Primary Care Providers	–	–	280.92	[-255.86,817.70]	41.18*	[7.11,75.24]	–	–	-69.62	[-406.70,267.47]	19.78*	[2.55,37.02]	–	–	18.24	[-35.75,72.22]	1.75	[-0.55,4.05]
Multisite Practice	–	–	-164.19	[-3447.34,3118.96]	-1529.09	[-5488.21,2430.04]	–	–	-728.02	[-2716.81,1260.77]	-57.89	[-2153.43,2037.66]	–	–	136.30	[-217.96,490.57]	-187.33	[-464.61,89.95]
Rural-Urban																		
Non-urban, Non-rural	13.83	[-2185.15,2212.82]	-375.98	[-1267.20,515.24]	-35.30	[-1093.83,1023.23]	596.67	[-500.30,1693.64]	57.23	[-491.19,605.66]	419.20	[-116.87,955.28]	-23.93	[-170.71,122.85]	-58.50	[-151.86,34.85]	58.17	[-13.15,129.48]
Rural	-6241.16**	[-10608.88,-1873.45]	-498.35	[-2302.19,1305.49]	-1236.46	[-3409.30,936.38]	-2751.25*	[-4977.16,-525.33]	306.13	[-813.89,1426.16]	-547.09	[-1772.53,678.36]	-72.59	[-372.01,226.84]	-225.39*	[-411.56,-39.23]	90.67	[-70.95,252.30]
Community-based Practice	1969.74	[-4198.74,8138.22]	1174.92	[-685.42,3035.26]	-276.07	[-1535.82,983.68]	-257.21	[-3520.03,3005.62]	328.34	[-807.62,1464.29]	-316.41	[-941.24,308.41]	-439.56	[-883.71,4.58]	58.45	[-139.20,256.11]	33.82	[-49.51,117.15]
County Proportion Poverty	28570.51*	[1674.63,55466.38]	-3406.31	[-15403.46,8590.85]	-14270.90*	[-26434.43,-2107.38]	15316.92*	[1813.91,28819.92]	613.23	[-6817.11,8043.58]	-4725.68	[-11164.18,1712.82]	-875.75	[-2683.68,932.18]	120.72	[-1119.14,1360.58]	- 1855.01***	[-2709.63,-1000.39]
Primary Care Providers/10,000 Populatio	209.97	[-122.90,542.85]	-151.04*	[-286.24,-15.83]	-38.99	[-116.21,38.23]	146.85	[-21.59,315.30]	-25.27	[-109.14,58.61]	-1.82	[-42.42,38.77]	-6.49	[-29.10,16.12]	-8.52	[-22.48,5.44]	0.24	[-5.14,5.63]
County Proportion Race/Ethnicity																		
Non-white, not Hispanic	- 8324.60*	[-16523.93,-125.27]	-447.15	[-3746.71,2852.41]	1598.66	[-1507.94,4705.27]	-5717.61**	[-9832.44,-1602.78]	-558.87	[-2607.74,1490.01]	946.64	[-738.14,2631.42]	130.94	[-419.57,681.45]	88.32	[-251.48,428.12]	610.60***	[387.67,833.54]
Hispanic	-6257.69	[-18161.61,5646.22]	93.41	[-5354.32,5541.15]	-1565.43	[-8085.87,4955.00]	-4405.22	[-10303.03,1492.58]	483.03	[-2896.44,3862.49]	-941.89	[-4341.85,2458.08]	-401.52	[-1189.00,385.95]	123.70	[-438.49,685.89]	520.75*	[69.68,971.82]
Year																		
2005	4965.78	[-8875.82,18807.39]	688.45	[-3712.39,5089.30]	1180.11	[-887.70,3247.93]	1497.95	[-5992.39,8988.28]	373.02	[-2445.71,3191.75]	413.17	[-920.63,1746.96]	219.85	[-805.51,1245.21]	23.29	[-401.77,448.35]	156.25	[-18.44,330.95]
2006	7671.42	[-6126.62,21469.47]	1174.11	[-3200.53,5548.75]	1258.95	[-781.92,3299.83]	2182.35	[-5284.89,9649.59]	481.17	[-2320.73,3283.07]	363.60	[-952.79,1679.99]	308.66	[-713.55,1330.87]	56.90	[-365.68,479.48]	150.78	[-21.63,323.19]
2007	7434.83	[-6338.95,21208.61]	1465.89	[-2899.73,5831.50]	1590.37	[-441.15,3621.89]	2390.84	[-5061.82,9843.50]	307.20	[-2488.40,3102.81]	537.02	[-772.03,1846.06]	305.77	[-714.40,1325.93]	78.28	[-343.59,500.15]	184.98*	[13.53,356.44]
2008	7792.83	[-5969.04,21554.71]	2033.80	[-2322.97,6390.57]	1718.77	[-305.76,3743.30]	2880.47	[-4565.07,10326.00]	675.86	[-2113.86,3465.58]	338.66	[-965.93,1643.24]	318.78	[-700.39,1337.95]	144.08	[-277.03,565.18]	252.90**	[82.03,423.77]
Constant	-9279.59	[-33627.84,15068.67]	4623.36	[-6196.74,15443.45]	-223.11	[-8002.89,7556.68]	-5952.91	[-19094.95,7189.14]	3736.69	[-3191.22,10664.60]	214.42	[-4780.19,5209.03]	57.08	[-1740.64,1854.79]	-38.9	[-1084.81,1007.01]	116.38	[-537.78,770.54]
Average practice intercept	7.49***	[6.62,8.36]	6.76***	[5.79,7.72]	7.45***	[7.22,7.68]	6.05*	[1.36,10.74]	-8.08***	[-10.14,-6.03]	6.12***	[5.45,6.78]	-10.93***	[-14.85,-7.01]	5.05***	[4.72,5.38]	4.18***	[3.50,4.87]
N	2139		9050		18500		2139		9050		18500		2139		9050		18500	

Notes: PCP is primary care provider. Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.16a: Continued

	OP						RX					
	Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)		Small (1 PCP)		Medium (2-3 PCP)		Large (>3 PCP)	
	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI
CCNC Patients (omitted = Very Low)												
Low	-1339.29*	[-2494.45,-184.12]	-1197.23**	[-2070.70,-323.76]	-268.08	[-1293.71,757.55]	-425.95*	[-842.75,-9.15]	-128.16	[-385.19,128.88]	138.57	[-136.85,414.00]
	(AME = -1339.29)		(AME = -1197.23)		(AME = -268.08)		(AME = -425.95)		(AME = -128.16)		(AME = 138.57)	
Medium	-1816.38*	[-3480.01,-152.74]	-1301.43**	[-2191.58,-411.29]	-667.02	[-1750.86,416.82]	-791.22**	[-1382.31,-200.13]	-286.20*	[-553.06,-19.34]	11.58	[-280.62,303.77]
	(AME = -1816.38)		(AME = -1301.43)		(AME = -667.02)		(AME = -791.22)		(AME = -286.20)		(AME = 11.58)	
High	-2760.19*	[-5294.10,-226.27]	-1324.90*	[-2379.69,-270.10]	-447.10	[-1536.56,642.36]	-833.72	[-1730.67,63.23]	-166.59	[-477.40,144.22]	81.55	[-212.13,375.23]
	(AME = -2760.19)		(AME = -1324.90)		(AME = -447.10)		(AME = -833.72)		(AME = -166.59)		(AME = 81.55)	
Very High	-726.82	[-3371.51,1917.86]	-1542.33**	[-2562.76,-521.89]	-865.63	[-1899.25,167.99]	-441.02	[-1355.27,473.24]	-302.65	[-609.26,3.97]	-271.90	[-551.37,7.57]
	(AME = -726.82)		(AME =-1542.33)		(AME = -865.63)		(AME = -441.02)		(AME = -302.65)		(AME = -271.90)	
CCNC Early Adopter	-367.47	[-1430.41,695.47]	473.47	[-72.66,1019.59]	61.48	[-488.32,611.27]	-104.45	[-531.98,323.08]	-88.16	[-261.81,85.49]	-181.38*	[-335.09,-27.67]
Person-level controls												
Age	-348.06	[-874.45,178.32]	-43.05	[-290.77,204.67]	- 22.09	[-208.36,164.18]	67.73	[-66.69,202.16]	67.07*	[8.29,125.85]	111.68***	[63.90,159.45]
Age^2	4.54	[-1.13,10.21]	0.59	[-2.07,3.25]	0.45	[-1.55,2.45]	-0.78	[-2.23,0.67]	-0.66*	[-1.30,-0.03]	-1.20***	[-1.71,-0.69]
Male	-700.6	[-1690.86,289.67]	-524.30*	[-983.29,-65.32]	-537.53**	[-897.15,-177.91]	51.65	[-203.37,306.66]	0.25	[-109.29,109.80]	41.15	[-51.14,133.43]
Charlson Index	1896.57***	[1043.71,2749.42]	1972.26***	[1548.74,2395.77]	2791.09***	[2495.14,3087.05]	852.44***	[635.63,1069.25]	618.08***	[517.57,718.59]	785.44***	[709.52,861.37]
Charlson Index^2	393.75***	[282.87,504.63]	355.66***	[295.57,415.74]	214.37***	[178.57,250.17]	-50.66***	[-78.83,-22.49]	-18.14*	[-32.38,-3.90]	-22.22***	[-31.40,-13.03]
Eligibility (omitted = subscriber)												
Spouse	2429.44**	[851.62,4007.25]	2297.73***	[1553.12,3042.34]	568.89*	[16.93,1120.84]	1362.08***	[955.85,1768.31]	837.85***	[660.58,1015.12]	1044.09***	[902.46,1185.72]
Other	-1353.12	[-14769.50,12063.26]	-862.74	[-5225.44,3499.97]	-1386.25	[-4148.56,1376.06]	945.28	[-2527.91,4418.46]	488.29	[-549.51,1526.08]	636.76	[-71.61,1345.13]
Plan Type (omitted = CMM)												
Smart Choice	1608.95	[-1016.56,4234.47]	-187.80	[-1454.18,1078.57]	297.29	[-682.37,1276.96]	651.89	[-22.29,1326.08]	182.00	[-118.23,482.23]	-186.04	[-437.30,65.22]
Smart Choice Basic	1155.20	[-1524.62,3835.01]	-793.49	[-2080.69,493.72]	-327.89	[-1333.23,677.45]	348.46	[-340.25,1037.18]	80.43	[-224.50,385.35]	-456.12***	[-713.96,-198.27]
Smart Choice Plus	4817.70**	[1421.14,8214.27]	1963.95*	[340.44,3587.46]	2205.01***	[1005.87,3404.14]	1577.20***	[706.23,2448.17]	670.59***	[285.31,1055.86]	240.93	[-66.61,548.48]
Practice and county-level controls												
# Primary Care Providers	—	—	236.99	[-116.50,590.47]	25.42*	[4.16,46.69]	—	—	36.71	[-61.32,134.75]	12.25***	[6.48,18.02]
Multisite Practice	—	—	225.42	[-2088.78,2539.62]	-1446.30	[-3938.28,1046.21]	—	—	375.97	[-429.48,1181.42]	108.87	[-587.89,805.62]
Rural-Urban												
Non-urban, Non-rural	-1130.13	[-2477.60,217.34]	-304.66	[-915.08,305.77]	-271.27	[-938.32,395.78]	448.20	[-80.43,976.83]	-91.10	[-287.01,104.98]	-129.12	[-315.41,57.16]
Rural	-2242.93	[-4968.11,482.25]	-608.74	[-1826.60,609.11]	-237.94	[-1591.44,1115.56]	-1294.60**	[-2264.40,-324.79]	-65.27	[-446.58,316.04]	-420.95*	[-790.38,-51.52]
Community-based Practice	2617.31	[-1351.16,6585.79]	403.50	[-888.35,1695.34]	-40.56	[-835.81,754.68]	122.01	[-1094.61,1338.62]	333.93	[-93.47,761.33]	196.27	[-26.71,419.26]
County Proportion Poverty	13544.40	[-3031.21,30120.01]	-2595.18	[-10706.35,5515.99]	-10215.71**	[-17821.99,-2609.42]	1875.69	[-4217.43,7968.82]	-1013.89	[-3477.95,1450.16]	479.61	[-1605.47,2564.70]
Primary Care Providers/10,000 Populatio	-20.99	[-227.46,185.49]	-94.49*	[-185.80,-3.18]	-34.13	[-82.63,14.37]	95.93*	[20.89,170.97]	-15.25	[-43.44,12.95]	-19.54**	[-33.01,-6.07]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	-98.17	[-5150.72,4954.38]	212.60	[-2010.56,2435.76]	1423.34	[-518.65,3365.32]	-3168.90***	[-5024.25,-1313.55]	-288.44	[-966.76,389.88]	-998.58***	[-1531.79,-465.37]
Hispanic	1675.76	[-5577.64,8929.16]	-884.64	[-4562.53,2793.25]	-424.67	[-4522.03,3672.69]	-3101.94*	[-6008.10,-195.78]	14.46	[-1124.40,1153.32]	-835.46	[-1973.21,302.30]
Year												
2005	2439.67	[-6639.24,11518.58]	120.67	[-2666.61,2907.96]	362.52	[-894.92,1619.96]	731.84	[-1628.56,3092.23]	158.49	[-521.93,838.92]	342.56*	[18.84,666.28]
2006	4113.20	[-4937.64,13164.04]	351.63	[-2419.38,3122.64]	299.48	[-941.60,1540.56]	1046.78	[-1305.22,3398.79]	194.59	[-482.47,871.65]	512.29**	[192.77,831.81]
2007	3556.51	[-5476.95,12589.96]	622.00	[-2144.31,3388.31]	251.24	[-984.41,1486.90]	1215.41	[-1134.21,3565.02]	384.17	[-292.60,1060.93]	640.54***	[322.25,958.84]
2008	3436.45	[-5588.47,12461.38]	739.63	[-2021.63,3500.90]	565.21	[-666.21,1796.63]	1176.65	[-1172.55,3525.85]	421.63	[-254.65,1097.91]	610.75***	[293.54,927.97]
Constant	-1994.50	[-17930.53,13941.54]	1959.34	[-4898.84,8817.53]	1059.86	[-3678.30,5798.03]	-1653.17	[-5862.68,2556.34]	-1013.44	[-2699.37,672.48]	-1482.45*	[-2707.57,-257.34]
Average practice intercept	6.48***	[4.59,8.38]	6.91***	[6.56,7.26]	7.04***	[6.80,7.28]	6.71***	[6.45,6.97]	6.34***	[6.20,6.47]	5.85***	[5.65,6.06]
N	2139		9050		18500		2139		9050		18500	

Notes: PCP is primary care provider. Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.16b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed-Effects Models, by Practice Size

	Total			IP			ED			OP			RX		
	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)	Small (1 PCP)	Medium (2-3 PCP)	Large (>3 PCP)
CCNC Patients (omitted=Very Low)															
Low															
MLM AME	- 3069.64**	- 1109.77	667.73	- 1409.40**	58.34	768.26	25.99	25.90	3.40	- 1339.29*	- 1197.23**	- 268.08	- 425.95*	- 128.16	138.57
	[-4931.07,-1208.21]	[-2405.58,186.04]	[-980.64,2316.10]	[-2346.84,-471.96]	[-746.69,863.37]	[-177.43,1713.95]	[-99.69,151.67]	[-106.98,158.78]	[-121.30,128.10]	[-2489.30.189.28]	[-2066.80,-327.66]	[-1289.13,752.96]	[-840.89,-11.01]	[-384.05,127.72]	[-135.62,412.76]
FE AME	-1008.90	2796.23	2218.25	- 657.96	2224.52	1460.45*	-125.73	- 84.42	- 192.92	101.28	526.21	527.91	- 326.49	129.91	422.87*
	[-4499.48,2481.68]	[-1175.90,6768.36]	[-417.83,4854.34]	[-1696.05,380.14]	[-1346.15,5795.19]	[70.51,2850.40]	[-376.76,125.30]	[-259.79,90.96]	[-627.15,241.30]	[-2732.34,2934.90]	[-915.58,1968.01]	[-836.75,1892.56]	[-1432.82,779.85]	[-285.36,545.17]	[21.09,824.65]
Medium															
MLM AME	- 3639.18**	- 1109.03	187.15	- 1166.54	290.73	1052.50*	25.22	60.70	- 80.42	- 1816.38*	- 1301.43**	- 667.02	- 791.22**	- 286.20*	11.58
	[-6038.07,-1240.29]	[-2291.28,73.22]	[-1376.46,1750.76]	[-2381.21,48.13]	[-442.52,1023.98]	[156.04,1948.96]	[-137.94,188.38]	[-62.21,183.61]	[-198.57,37.73]	[-3304.99,-327.77]	[-2097.92,-504.93]	[-1636.83,302.79]	[-1320.12,-262.32]	[-524.98,-47.42]	[-249.87,273.03]
FE AME	- 1456.53	3983.67	1661.95	434.87	3205.32	1822.01*	- 80.42	- 26.13	- 238.28	- 1513.11	678.16	- 323.59	- 297.86	126.32	401.96
	[-6732.86,3819.81]	[-426.47,8393.81]	[-1381.06,4704.95]	[-2295.53,3165.27]	[-656.40,7067.04]	[242.87,3401.16]	[-465.45,304.60]	[-310.26,258.01]	[-681.62,205.07]	[-4888.68,1862.46]	[-1105.07,2461.39]	[-2240.57,1593.39]	[-1540.64,944.92]	[-326.25,578.89]	[-48.70,852.61]
High															
MLM AME	- 3724.44	- 1045.98	1041.90	- 389.02	268.44	1431.01*	85.02	60.42	- 14.59	- 2760.19	- 1324.90*	- 447.10	- 833.72	- 166.59	81.55
	[-8445.21,996.33]	[-2850.35,758.39]	[-979.52,3063.32]	[-2764.77,1986.73]	[-849.73,1386.61]	[273.97,2588.05]	[-233.07,403.11]	[-125.08,245.92]	[-167.12,137.94]	[-5676.20,155.82]	[-2538.75,-111.05]	[-1700.84,806.64]	[-1865.92,198.48]	[-524.27,191.09]	[-256.41,419.51]
FE AME	2729.12	1335.90	3104.86	1619.82	975.46	2740.51**	- 480.31	- 173.03	- 233.40	1764.53	451.97	170.14	- 174.92	81.51	427.98
	[-5095.41,10553.65]	[-4428.86,7100.66]	[-262.38,6472.10]	[-2221.74,5461.38]	[-3791.28,5742.19]	[662.62,4818.40]	[-1414.13,453.51]	[-645.88,299.81]	[-695.15,228.35]	[-4919.03,8448.10]	[-1846.77,2750.70]	[-1877.05,2217.33]	[-1811.60,1461.76]	[-403.18,566.19]	[-108.74,964.70]
Very High															
MLM AME	- 1712.33	- 2187.43**	- 141.47	- 859.72	- 357.49	904.73	418.28**	28.91	- 7.03	- 726.82	- 1542.33**	- 865.63	- 441.02	- 302.65	- 271.90
	[-6239.09,2814.43]	[-3803.68,-571.18]	[-1916.85,1633.91]	[-3162.83,1443.39]	[-1360.26,645.28]	[-105.27,1914.73]	[108.67,727.89]	[-137.43,195.25]	[-140.22.126.16]	[-3547.61,2093.97]	[-2630.71,-453.95]	[-1968.07,236.81]	[-1416.15,534.11]	[-629.69,24.39]	[-569.98,26.18]
FE AME	2109.60	1345.22	4139.58*	19.81	1323.73	3231.82**	-319.65	- 229.92	- 285.16	2332.10	157.37	930.70	77.35	94.04	262.53
	[-5214.71,9433.92]	[-4541.42,7231.87]	[533.38,7745.77]	[-3736.10,3775.72]	[-3420.17,6067.64]	[1104.00,5359.63]	[-1384.17,744.87]	[-744.69,284.85]	[-752.72,182.40]	[-4369.87,9034.06]	[-2536.39,2851.13]	[-1415.71,3277.10]	[-1416.77,1571.48]	[-502.92,691.00]	[-281.00,806.05]

Notes: Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.17a: Multi-Level Odds Ratios of the Effect of CCNC on Receipt of Yearly Diabetes Measures, by Baseline Values

	>=1 A1C						>=1 LDL					
	Low (<80%)		Medium (80-95%)		Medium (80-95%)		Low (<56%)		Medium (56-73%)		High (>73%)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC	1.03	[0.84,1.26]	1.17	[0.93,1.48]	1.26	[0.90,1.78]	0.89	[0.73,1.07]	1.17	[0.96,1.41]	1.04	[0.83,1.30]
	(AME = 0.004)		(AME = 0.018)		(AME = 0.021)		(AME = -0.021)		(AME = 0.027)		(AME = 0.005)	
Ever CCNC	0.37***	[0.23,0.59]	0.84	[0.61,1.16]	0.61*	[0.39,0.95]	0.57*	[0.37,0.89]	0.98	[0.72,1.33]	0.74	[0.54,1.01]
CCNC Early Adopter	1.90*	[1.16,3.13]	0.85	[0.63,1.15]	0.66*	[0.44,0.97]	1.50	[0.94,2.39]	0.91	[0.66,1.25]	0.99	[0.72,1.36]
Person-level controls												
Age	1.03	[0.98,1.08]	1.03	[0.98,1.09]	1.06*	[1.00,1.12]	1.08***	[1.04,1.13]	1.09***	[1.05,1.14]	1.15***	[1.10,1.20]
Age^2	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00**	[1.00,1.00]	1.00***	[1.00,1.00]
Male	0.99	[0.90,1.09]	1.19***	[1.08,1.32]	1.25***	[1.12,1.40]	1.06	[0.98,1.16]	1.15**	[1.05,1.25]	1.21***	[1.10,1.32]
Charlson Index	3.22***	[2.95,3.52]	6.36***	[5.69,7.12]	7.69***	[6.80,8.69]	1.39***	[1.29,1.50]	1.58***	[1.46,1.72]	1.69***	[1.55,1.84]
Charlson Index^2	0.89***	[0.88,0.90]	0.84***	[0.82,0.85]	0.82***	[0.81,0.83]	0.96***	[0.95,0.97]	0.94***	[0.93,0.95]	0.94***	[0.93,0.95]
Eligibility (omitted = subscriber)												
Spouse	0.86*	[0.75,0.98]	0.73***	[0.62,0.85]	0.86	[0.72,1.03]	0.86*	[0.76,0.99]	0.84**	[0.74,0.95]	0.78***	[0.68,0.89]
Other	1.04	[0.54,2.00]	1.24	[0.60,2.55]	1.51	[0.60,3.83]	0.73	[0.36,1.50]	1.66	[0.91,3.03]	1.04	[0.51,2.09]
Plan Type (omitted = CMM)												
Smart Choice	1.25*	[1.02,1.54]	1.29*	[1.01,1.65]	0.92	[0.65,1.29]	1.31**	[1.07,1.59]	1.19	[0.97,1.46]	1.17	[0.94,1.46]
Smart Choice Basic	1.17	[0.94,1.45]	1.22	[0.95,1.58]	0.84	[0.60,1.19]	1.23*	[1.00,1.50]	1.12	[0.91,1.38]	1.10	[0.88,1.38]
Smart Choice Plus	1.43*	[1.08,1.88]	1.07	[0.78,1.48]	0.89	[0.59,1.34]	1.42**	[1.10,1.82]	1.25	[0.96,1.63]	1.30	[0.97,1.75]
Practice and county-level controls												
# Primary Care Providers	1.00	[1.00,1.01]	1.00	[0.99,1.02]	0.99	[0.97,1.01]	1.00	[0.99,1.00]	1.00	[0.99,1.02]	0.99	[0.97,1.01]
Multisite Practice	—	—	4.55	[0.66,31.33]	1.86	[0.25,13.88]	2.37	[0.18,31.11]	1.72	[0.45,6.51]	3.03	[0.55,16.69]
Rural-Urban												
Non-urban, Non-rural	0.75	[0.48,1.15]	1.00	[0.74,1.36]	0.67*	[0.47,0.95]	0.78	[0.52,1.19]	0.93	[0.70,1.24]	1.00	[0.75,1.34]
Rural	—	—	0.31*	[0.12,0.80]	1.14	[0.55,2.36]	1.45	[0.48,4.45]	0.41*	[0.17,0.99]	0.52	[0.26,1.03]
Community-based Practice	1.07	[0.46,2.44]	1.07	[0.76,1.51]	1.96*	[1.02,3.76]	0.96	[0.45,2.07]	1.23	[0.82,1.83]	1.28	[0.83,1.97]
County Proportion Poverty	36.27*	[1.03,1272.5	0.13	[0.01,2.70]	1.38	[0.04,48.77]	0.02*	[0.00,0.42]	0.54	[0.03,10.68]	4.48	[0.22,89.24]
Primary Care Providers/10,000 Population	0.98	[0.95,1.01]	0.99	[0.97,1.01]	0.98	[0.95,1.01]	0.95***	[0.92,0.98]	1.00	[0.97,1.02]	0.99	[0.96,1.01]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.14**	[0.04,0.45]	2.83*	[1.14,6.99]	2.11	[0.73,6.11]	1.04	[0.34,3.16]	2.11	[0.88,5.06]	0.59	[0.25,1.41]
Hispanic	0.27	[0.02,4.40]	1.00	[0.16,6.12]	0.26	[0.03,2.21]	0.71	[0.06,8.14]	0.71	[0.13,4.00]	1.24	[0.18,8.60]
Year												
2005	2.43***	[1.96,3.00]	0.78*	[0.62,0.98]	0.01***	[0.00,0.02]	3.89***	[3.18,4.75]	1.47***	[1.22,1.76]	0.60***	[0.48,0.74]
2006	2.37***	[1.91,2.95]	0.76*	[0.60,0.96]	0.01***	[0.00,0.02]	4.47***	[3.64,5.49]	1.52***	[1.26,1.82]	0.58***	[0.47,0.71]
2007	2.64***	[2.09,3.32]	0.83	[0.66,1.05]	0.01***	[0.00,0.02]	5.08***	[4.11,6.30]	1.76***	[1.46,2.12]	0.69***	[0.56,0.86]
2008	2.70***	[2.15,3.39]	0.75*	[0.59,0.96]	0.01***	[0.00,0.02]	5.55***	[4.49,6.87]	1.70***	[1.42,2.05]	0.70**	[0.57,0.88]
Constant	0.21*	[0.04,0.98]	0.31	[0.08,1.16]	31.94***	[4.53,225.07]	0.06***	[0.02,0.27]	0.05***	[0.01,0.14]	0.06***	[0.02,0.23]
Average practice intercept	1.29***	[1.16,1.43]	0.50***	[0.42,0.60]	0.89	[0.78,1.01]	1.26***	[1.13,1.40]	0.58***	[0.50,0.68]	0.67***	[0.58,0.77]
N	14051		14983		15933		14586		13993		16388	

Notes : A1c is hemoglobin A1c test, LDL is low-density lipoprotein test. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.17a: Continued

	>=1 Eye Exam						Attention for Nephropathy					
	Low (<25%)		Medium (25-40%)		High (>40%)		Low (<71%)		Medium (71-84%)		High (>84%)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC	0.94	[0.77,1.14]	0.97	[0.84,1.13]	1.07	[0.90,1.27]	1.14	[0.97,1.34]	0.86	[0.69,1.06]	1.01	[0.78,1.31]
	(AME = -0.012)		(AME = -0.006)		(AME = 0.015)		(AME = 0.0219)		(AME = -0.0210)		(AME = 0.001)	
Ever CCNC	0.93	[0.74,1.16]	0.96	[0.82,1.13]	1.05	[0.87,1.26]	0.99	[0.81,1.22]	1.04	[0.80,1.36]	1.02	[0.75,1.38]
CCNC Early Adopter	1.05	[0.89,1.24]	0.91	[0.80,1.04]	0.99	[0.84,1.16]	0.90	[0.73,1.10]	0.93	[0.74,1.16]	0.99	[0.76,1.29]
Person-level controls												
Age	0.95*	[0.91,1.00]	0.95**	[0.92,0.98]	0.97	[0.94,1.01]	1.08***	[1.03,1.12]	1.10***	[1.05,1.15]	1.08**	[1.03,1.14]
Age^2	1.00**	[1.00,1.00]	1.00***	[1.00,1.00]	1.00*	[1.00,1.00]	1.00**	[1.00,1.00]	1.00**	[1.00,1.00]	1.00*	[1.00,1.00]
Male	0.78***	[0.71,0.85]	0.87***	[0.81,0.92]	0.79***	[0.73,0.85]	0.97	[0.89,1.05]	1.09	[1.00,1.20]	0.93	[0.84,1.02]
Charlson Index	1.78***	[1.63,1.95]	1.63***	[1.54,1.73]	1.93***	[1.80,2.07]	1.82***	[1.69,1.96]	1.99***	[1.82,2.18]	2.34***	[2.12,2.58]
Charlson Index^2	0.94***	[0.93,0.96]	0.96***	[0.95,0.97]	0.94***	[0.93,0.95]	0.96***	[0.95,0.97]	0.94***	[0.93,0.95]	0.92***	[0.91,0.93]
Eligibility (omitted = subscriber)												
Spouse	1.04	[0.91,1.19]	0.94	[0.86,1.04]	0.99	[0.89,1.11]	1.02	[0.89,1.16]	0.86*	[0.75,1.00]	0.90	[0.77,1.04]
Other	0.25*	[0.08,0.77]	0.60	[0.30,1.22]	1.36	[0.81,2.31]	0.91	[0.52,1.57]	1.50	[0.76,2.99]	0.55	[0.27,1.13]
Plan Type (omitted = CMM)												
Smart Choice	1.38**	[1.09,1.75]	1.19*	[1.02,1.40]	1.48***	[1.23,1.77]	1.18	[0.98,1.43]	1.19	[0.96,1.49]	1.29*	[1.00,1.66]
Smart Choice Basic	1.14	[0.90,1.46]	0.91	[0.77,1.07]	1.17	[0.97,1.42]	1.01	[0.82,1.23]	1.23	[0.98,1.54]	1.14	[0.88,1.48]
Smart Choice Plus	1.32	[0.98,1.78]	1.19	[0.97,1.45]	1.32*	[1.05,1.67]	1.26	[0.98,1.62]	1.39*	[1.03,1.88]	1.10	[0.80,1.51]
Practice and county-level controls												
# Primary Care Providers	1.01	[0.99,1.03]	1.01	[1.00,1.02]	1.00	[0.99,1.00]	1.00	[1.00,1.01]	1.00	[0.99,1.01]	0.99	[0.98,1.00]
Multisite Practice	1.43	[0.86,2.40]	1.27	[0.62,2.60]	—	—	1.02	[0.52,1.97]	—	—	1.67	[0.41,6.84]
Rural-Urban												
Non-urban, Non-rural	0.90	[0.77,1.05]	0.95	[0.84,1.08]	0.92	[0.78,1.08]	0.87	[0.72,1.04]	0.92	[0.74,1.14]	0.91	[0.70,1.18]
Rural	0.71	[0.47,1.06]	0.61*	[0.39,0.93]	0.98	[0.70,1.38]	0.75	[0.45,1.24]	1.23	[0.80,1.91]	0.91	[0.44,1.86]
Community-based Practice	0.73*	[0.56,0.95]	1.09	[0.89,1.33]	0.98	[0.82,1.18]	0.84	[0.63,1.12]	1.08	[0.81,1.44]	0.76	[0.48,1.19]
County Proportion Poverty	0.96	[0.14,6.50]	1.06	[0.25,4.45]	0.59	[0.10,3.50]	0.18	[0.02,1.47]	0.17	[0.02,1.80]	0.09	[0.01,1.49]
Primary Care Providers/10,000 Population	0.99	[0.98,1.01]	1.01	[1.00,1.02]	1.01	[1.00,1.02]	0.99	[0.98,1.00]	1.01	[0.99,1.03]	0.98*	[0.96,1.00]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.94	[0.56,1.59]	0.74	[0.50,1.10]	0.82	[0.51,1.32]	2.17**	[1.22,3.86]	1.78	[0.94,3.38]	2.32*	[1.04,5.15]
Hispanic	0.25*	[0.08,0.76]	0.38*	[0.16,0.87]	0.82	[0.30,2.26]	1.00	[0.31,3.27]	2.15	[0.49,9.33]	1.19	[0.24,5.89]
Year												
2005	2.95***	[2.36,3.69]	0.99	[0.87,1.14]	0.48***	[0.41,0.56]	2.75***	[2.33,3.24]	1.65***	[1.35,2.01]	0.32***	[0.24,0.42]
2006	3.21***	[2.56,4.03]	1.12	[0.98,1.28]	0.48***	[0.41,0.56]	2.84***	[2.41,3.35]	1.57***	[1.29,1.91]	0.31***	[0.24,0.41]
2007	5.50***	[4.38,6.91]	1.62***	[1.42,1.85]	0.65***	[0.56,0.76]	3.40***	[2.86,4.03]	1.55***	[1.27,1.89]	0.31***	[0.24,0.41]
2008	6.02***	[4.79,7.57]	1.80***	[1.57,2.06]	0.71***	[0.61,0.83]	3.10***	[2.62,3.67]	1.50***	[1.23,1.83]	0.33***	[0.25,0.43]
Constant	0.21*	[0.06,0.70]	0.47	[0.19,1.14]	0.54	[0.21,1.40]	0.09***	[0.03,0.27]	0.07***	[0.02,0.22]	1.35	[0.36,5.04]
Average practice intercept	0.26***	[0.20,0.33]	0.22***	[0.18,0.28]	0.21***	[0.16,0.28]	0.37***	[0.31,0.45]	0.37***	[0.30,0.45]	0.52***	[0.44,0.61]
N	11620		19488		13859		14971		14381		15615	

Notes : A1c is hemoglobin A1c test, LDL is low-density lipoprotein test. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.17b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models, by Baseline Values

	>=1 A1C			>=1 LDL			>=1 Eye Exam			Attention for Nephropathy		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
CCNC												
MLM AME	0.004	0.018	0.021	- 0.021	0.027	0.005	- 0.012	- 0.006	0.015	0.0219	- 0.02102	0.001
	[-0.028,0.036]	[-0.0079,0.0431]	[-0.0089,0.0513]	[-0.055,0.013]	[-0.0058,0.0598]	[-0.025,0.035]	[-0.049,0.025]	[-0.039,0.027]	[-0.024,0.054]	[-0.0046,0.0484]	[-0.052,0.010]	[-0.029,0.031]
FE AME	0.007	0.012	- 0.005	- 0.017	0.016	- 0.001	- 0.007	0.003	0.001	0.0228	- 0.02260	0.006
	[-0.058,0.072]	[-0.016,0.039]	[-0.032,0.022]	[-0.075,0.041]	[-0.019,0.051]	[-0.040,0.037]	[-0.037,0.024]	[-0.020,0.025]	[-0.041,0.042]	[-0.0076,0.0533]	[-0.04600,0.00080]	[-0.026,0.037]

Notes: Logit models used for mult-level models. Cluster robust linear probability models used for fixed-effects models.

*p<0.05,**p<0.01,***p<0.001

Table 5.18a: Multi-Level Odds Ratios of the Moderating Effect of CCNC Patient Load on Receipt of Yearly Diabetes Measures, by Baseline Values

	>=1 A1C				>=1 LDL					
	Low (<78%)		High (>=78%)		Low (<50%)		Medium (50-72%)		High (>72%)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC Patients (omitted = Very Low)										
Low	1.23	[0.75,2.01]	1.01	[0.69,1.47]	0.81	[0.45,1.44]	1.18	[0.79,1.77]	0.90	[0.62,1.33]
	(AME = 0.0313)		(AME = 0.0014)		(AME = -0.0358)		(AME = 0.0288)		(AME = -0.013)	
Medium	0.88	[0.52,1.51]	0.94	[0.63,1.40]	0.67	[0.36,1.24]	1.21	[0.76,1.93]	0.85	[0.55,1.31]
	(AME= -0.0194)		(AME = -0.0072)		(AME = -0.0683)		(AME = 0.0333)		(AME = -0.0211)	
High	0.85	[0.47,1.51]	0.81	[0.53,1.23]	0.68	[0.35,1.30]	1.02	[0.63,1.66]	0.63*	[0.40,0.99]
	(AME = -0.0263)		(AME = -0.0244)		(AME = -0.0669)		(AME = 0.0049)		(AME = -0.0655)	
Very High	1.32	[0.72,2.44]	0.88	[0.58,1.33]	0.67	[0.33,1.33]	1.11	[0.69,1.78]	0.64	[0.40,1.00]
	(AME = 0.0424)		(AME = -0.0142)		(AME = -0.0696)		(AME = 0.0179)		(AME = -0.0638)	
CCNC Early Adopter	2.08**	[1.23,3.52]	0.70*	[0.53,0.92]	1.92*	[1.12,3.27]	1.21	[0.86,1.71]	0.89	[0.63,1.26]
Person-level controls										
Age	1.00	[0.94,1.06]	1.06*	[1.01,1.11]	1.05	[0.99,1.12]	1.09***	[1.03,1.14]	1.19***	[1.12,1.27]
Age^2	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00***	[1.00,1.00]
Male	0.96	[0.86,1.09]	1.29***	[1.17,1.43]	0.99	[0.88,1.11]	1.11	[1.00,1.23]	1.22**	[1.08,1.38]
Charlson Index	3.19***	[2.85,3.56]	6.57***	[5.91,7.30]	1.29***	[1.17,1.42]	1.59***	[1.44,1.76]	1.88***	[1.67,2.12]
Charlson Index^2	0.89***	[0.88,0.91]	0.82***	[0.81,0.83]	0.98***	[0.97,0.99]	0.94***	[0.93,0.95]	0.93***	[0.91,0.94]
Eligibility (omitted = subscriber)										
Spouse	0.69***	[0.57,0.83]	0.82*	[0.70,0.96]	0.85	[0.71,1.03]	0.80**	[0.68,0.94]	0.80*	[0.66,0.97]
Other	0.81	[0.36,1.85]	1.06	[0.49,2.31]	1.13	[0.44,2.88]	0.85	[0.37,1.98]	0.77	[0.29,2.02]
Plan Type (omitted = CMM)										
Smart Choice	1.16	[0.85,1.58]	1.06	[0.80,1.40]	1.43*	[1.06,1.93]	1.41*	[1.07,1.86]	1.07	[0.76,1.49]
Smart Choice Basic	1.05	[0.77,1.44]	0.99	[0.74,1.32]	1.30	[0.96,1.76]	1.32	[0.99,1.76]	0.96	[0.68,1.36]
Smart Choice Plus	1.21	[0.83,1.77]	0.94	[0.67,1.33]	1.33	[0.93,1.93]	1.27	[0.90,1.78]	0.90	[0.58,1.39]
Practice and county-level controls										
# Primary Care Providers	1.00	[1.00,1.01]	1.02	[1.00,1.04]	0.99	[0.99,1.00]	0.98	[0.96,1.01]	0.99	[0.97,1.01]
Multisite Practice	4.37	[0.39,49.38]	2.41	[0.25,23.15]	5.79	[0.27,122.24]	1.19	[0.19,7.44]	5.06	[0.47,54.53]
Rural-Urban										
Non-urban, Non-rural	1.11	[0.61,2.02]	0.94	[0.69,1.28]	1.05	[0.58,1.90]	1.35	[0.92,1.98]	0.88	[0.61,1.29]
Rural	0.44	[0.17,1.15]	1.11	[0.55,2.22]	0.32*	[0.12,0.87]	0.51	[0.18,1.45]	0.83	[0.41,1.69]
Community-based Practice	0.82	[0.22,3.00]	0.98	[0.57,1.68]	1.06	[0.26,4.37]	0.60	[0.32,1.11]	0.94	[0.46,1.90]
County Proportion Poverty	3.54	[0.03,367.41]	0.95	[0.04,22.58]	0.23	[0.00,21.27]	0.03	[0.00,1.07]	0.17	[0.00,8.98]
Primary Care Providers/10,000 Population	0.96	[0.92,1.00]	0.97*	[0.93,1.00]	0.92***	[0.88,0.96]	1.01	[0.97,1.05]	0.97	[0.93,1.02]
County Proportion Race/Ethnicity										
Non-white, not Hispanic	0.31	[0.06,1.64]	1.03	[0.40,2.66]	0.99	[0.19,5.12]	0.77	[0.24,2.45]	0.52	[0.16,1.64]
Hispanic	0.26	[0.01,8.06]	0.89	[0.15,5.19]	0.06	[0.00,1.97]	0.46	[0.05,4.08]	5.23	[0.66,41.52]
Year										
2005	3.75***	[2.20,6.39]	0.18***	[0.09,0.34]	3.12***	[1.75,5.57]	1.66**	[1.19,2.32]	0.35	[0.12,1.03]
2006	4.00***	[2.36,6.78]	0.16***	[0.08,0.30]	3.31***	[1.87,5.87]	1.83***	[1.31,2.54]	0.33*	[0.11,0.95]
2007	4.23***	[2.49,7.16]	0.17***	[0.09,0.32]	4.10***	[2.31,7.29]	2.05***	[1.47,2.86]	0.39	[0.14,1.13]
2008	4.59***	[2.71,7.77]	0.16***	[0.08,0.30]	4.42***	[2.49,7.83]	1.95***	[1.41,2.70]	0.39	[0.13,1.13]
Constant	0.12	[0.01,1.10]	1.68	[0.37,7.53]	0.08*	[0.01,0.81]	0.13**	[0.03,0.57]	0.10*	[0.01,0.84]
Average practice intercept	1.60***	[1.41,1.82]	0.98	[0.87,1.10]	1.47***	[1.28,1.69]	0.82*	[0.69,0.96]	0.91	[0.78,1.06]
N	8463		16918		7445		9599		8337	

Notes: A1c is hemoglobin A1c test, LDL is low-density lipoprotein test. Logit models used for all outcomes.
*p<0.05,**p<0.01,***p<0.001

Table 5.18a: Continued

	>=1 Eye Exam						Attention for Nephropathy					
	Low (<25%)		Medium (25-40%)		High (>40%)		Low (<71%)		Medium (71-86%)		High (>86%)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC Patients (omitted = Very Low)												
Low	0.96	[0.72,1.28]	1.12	[0.90,1.40]	1.12	[0.89,1.42]	0.71*	[0.51,0.99]	1.06	[0.72,1.55]	0.80	[0.55,1.18]
	(AME = -0.0074)		(AME = 0.0256)		(AME = 0.0271)		(AME = -0.0535)		(AME = 0.0066)		(AME = -0.0268)	
Medium	1.01	[0.76,1.34]	1.03	[0.81,1.30]	0.95	[0.75,1.21]	0.83	[0.59,1.17]	0.89	[0.59,1.34]	0.86	[0.59,1.27]
	(AME = 0.0018)		(AME = 0.0055)		(AME = -0.0129)		(AME = -0.028)		(AME = -0.0202)		(AME = -0.0179)	
High	0.96	[0.72,1.30]	1.10	[0.84,1.44]	1.07	[0.83,1.38]	0.81	[0.57,1.16]	0.95	[0.62,1.44]	1.04	[0.69,1.59]
	(AME = -0.0074)		(AME = 0.0217)		(AME = 0.0157)		(AME = -0.032)		(AME = -0.0094)		(AME = 0.0054)	
Very High	0.91	[0.67,1.23]	0.91	[0.71,1.16]	0.96	[0.77,1.21]	0.82	[0.58,1.15]	1.16	[0.76,1.75]	0.95	[0.63,1.44]
	(AME = -0.0184)		(AME = -0.0207)		(AME = -0.0094)		(AME = -0.0306)		(AME = 0.0193)		(AME = -0.0057)	
CCNC Early Adopter	0.99	[0.87,1.14]	0.92	[0.78,1.07]	0.94	[0.80,1.10]	0.94	[0.76,1.15]	0.88	[0.68,1.14]	1.08	[0.84,1.40]
Person-level controls												
Age	0.96	[0.91,1.02]	0.97	[0.92,1.02]	0.97	[0.92,1.01]	1.10***	[1.05,1.15]	1.13***	[1.06,1.20]	1.13***	[1.06,1.21]
Age^2	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00*	[1.00,1.00]	1.00**	[1.00,1.00]	1.00**	[1.00,1.00]	1.00**	[1.00,1.00]
Male	0.80***	[0.72,0.88]	0.85***	[0.77,0.94]	0.78***	[0.71,0.86]	1.03	[0.93,1.14]	1.09	[0.96,1.24]	0.96	[0.84,1.10]
Charlson Index	1.67***	[1.50,1.85]	1.73***	[1.59,1.89]	1.78***	[1.64,1.94]	1.73***	[1.58,1.89]	2.20***	[1.95,2.48]	2.66***	[2.34,3.03]
Charlson Index^2	0.95***	[0.94,0.97]	0.96***	[0.94,0.97]	0.95***	[0.94,0.96]	0.96***	[0.95,0.97]	0.93***	[0.92,0.95]	0.91***	[0.89,0.92]
Eligibility (omitted = subscriber)												
Spouse	1.02	[0.86,1.21]	0.86*	[0.74,0.99]	0.92	[0.80,1.07]	0.93	[0.78,1.10]	0.92	[0.76,1.12]	0.77*	[0.63,0.94]
Other	0.19*	[0.04,0.89]	1.01	[0.36,2.85]	1.24	[0.64,2.40]	1.16	[0.60,2.24]	0.93	[0.33,2.57]	1.02	[0.39,2.65]
Plan Type (omitted = CMM)												
Smart Choice	1.59**	[1.16,2.18]	1.17	[0.90,1.52]	1.41**	[1.10,1.80]	1.27	[0.98,1.65]	1.35	[0.98,1.85]	1.29	[0.87,1.91]
Smart Choice Basic	1.22	[0.88,1.68]	0.86	[0.66,1.13]	1.10	[0.85,1.42]	1.11	[0.86,1.45]	1.23	[0.89,1.70]	1.09	[0.73,1.63]
Smart Choice Plus	1.66**	[1.13,2.44]	1.20	[0.87,1.65]	1.31	[0.96,1.78]	1.25	[0.91,1.73]	1.47	[0.95,2.27]	0.97	[0.60,1.57]
Practice and county-level controls												
# Primary Care Providers	1.02*	[1.00,1.04]	1.01	[0.99,1.02]	1.00	[0.99,1.00]	1.00	[1.00,1.01]	0.98*	[0.97,1.00]	1.00	[0.98,1.02]
Multisite Practice	1.35	[0.83,2.22]	—	—	0.95	[0.39,2.32]	1.07	[0.48,2.42]	—	—	1.28	[0.26,6.44]
Rural-Urban												
Non-urban, Non-rural	0.85*	[0.73,0.99]	0.86	[0.72,1.04]	0.79*	[0.66,0.96]	0.80	[0.64,1.01]	0.82	[0.61,1.09]	0.91	[0.67,1.24]
Rural	0.62**	[0.46,0.84]	0.48**	[0.29,0.81]	0.81	[0.58,1.15]	0.66	[0.41,1.08]	1.03	[0.61,1.73]	0.98	[0.57,1.69]
Community-based Practice	0.89	[0.68,1.17]	1.06	[0.82,1.37]	1.02	[0.74,1.41]	0.76	[0.50,1.15]	0.76	[0.52,1.11]	0.47	[0.18,1.23]
County Proportion Poverty	1.59	[0.23,11.16]	2.63	[0.32,21.41]	2.31	[0.25,21.52]	0.54	[0.03,8.26]	3.12	[0.09,110.77]	0.05	[0.00,1.40]
Primary Care Providers/10,000 Population	0.99	[0.97,1.01]	1.01	[1.00,1.03]	1.01	[1.00,1.03]	0.98*	[0.96,1.00]	1.01	[0.97,1.04]	0.98	[0.95,1.00]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.77	[0.45,1.32]	0.51*	[0.28,0.91]	0.70	[0.39,1.25]	1.08	[0.51,2.29]	1.10	[0.42,2.88]	1.69	[0.66,4.30]
Hispanic	0.30*	[0.11,0.87]	0.38	[0.13,1.18]	1.14	[0.41,3.23]	1.10	[0.27,4.51]	0.87	[0.13,5.83]	2.45	[0.47,12.84]
Year												
2005	3.16**	[1.32,7.58]	1.04	[0.75,1.44]	0.66*	[0.47,0.93]	2.34***	[1.71,3.20]	1.04	[0.58,1.87]	0.38*	[0.17,0.86]
2006	3.07*	[1.28,7.34]	1.20	[0.87,1.66]	0.62**	[0.44,0.88]	2.51***	[1.84,3.41]	1.16	[0.65,2.07]	0.33**	[0.15,0.75]
2007	5.24***	[2.20,12.51]	1.79***	[1.30,2.46]	0.83	[0.59,1.17]	2.78***	[2.04,3.78]	1.15	[0.65,2.04]	0.33**	[0.15,0.74]
2008	5.90***	[2.47,14.09]	1.93***	[1.41,2.65]	0.92	[0.66,1.29]	2.69***	[1.98,3.64]	1.12	[0.63,2.00]	0.32**	[0.14,0.73]
Constant	0.12*	[0.02,0.65]	0.22*	[0.06,0.79]	0.41	[0.11,1.48]	0.10***	[0.03,0.39]	0.06***	[0.01,0.32]	0.65	[0.08,5.12]
Average practice intercept	0.21***	[0.14,0.31]	0.24***	[0.17,0.34]	0.27***	[0.20,0.35]	0.46***	[0.38,0.57]	0.43***	[0.33,0.56]	0.63***	[0.53,0.76]
N	7675		9051		8655		9852		7493		8036	

Notes : A1c is hemoglobin A1c test, LDL is low-density lipoprotein test. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.18b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed Effects Models, by Baseline Values

	>=1 A1C		>=1 LDL			>=1 Eye Exam			Attention for Nephropathy		
	Low	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
CCNC Patients (omitted=Very Low)											
Low											
MLM AME	0.031	0.001	- 0.036	0.029	- 0.013	- 0.007	0.026	0.027	- 0.0535	0.007*	- 0.027
	[-0.040,0.103]	[-0.040,0.043]	[-0.132,0.060]	[-0.036,0.094]	[-0.064,0.038]	[-0.064,0.049]	[-0.022,0.073]	[-0.024,0.079]	[-0.1096,0.0026]	[0.011,0.121]	[-0.079,0.026]
FE AME	0.0478	- 0.0176	0.0205	- 0.0010	-0.0471	- 0.0711	0.0208	0.0318	- 0.0732*	0.0031	0.0259
	[-0.0417,0.1373]	[-0.0569,0.0217]	[-0.0956,0.1365]	[-0.0941,0.0920]	[-0.1201,0.0259]	[-0.3013,0.1591]	[-0.0471,0.0888]	[-0.0402,0.1038]	[-0.1427,-0.0037]	[-0.0670,0.0732]	[-0.0554,0.1072]
Medium											
MLM AME	- 0.019	- 0.007	- 0.068	0.033	- 0.021	0.002	0.005	- 0.013	- 0.028	- 0.020	- 0.018
	[-0.114,0.075]	[-0.061,0.046]	[-0.186,0.049]	[-0.054,0.120]	[-0.090,0.048]	[-0.065,0.069]	[-0.054,0.065]	[-0.072,0.047]	[-0.091,0.035]	[-0.096,0.055]	[-0.077,0.041]
FE AME	-0.0126	-0.0411	0.0025	-0.0192	- 0.0942	- 0.0276	- 0.0010	-0.0050	-0.0650	- 0.0021	0.0497
	[-0.1251,0.0999]	[-0.1025,0.0203]	[-0.1265,0.1315]	[-0.1434,0.1050]	[-0.2098,0.0214]	[-0.2672,0.2120]	[-0.0942,0.0922]	[-0.1107,0.1007]	[-0.1518,0.0217]	[-0.1355,0.1313]	[-0.0463,0.1456]
High											
MLM AME	- 0.026	- 0.024	- 0.067	0.005	- 0.0655	- 0.007	0.022	0.016	- 0.032	- 0.009	0.005
	[-0.119,0.067]	[-0.078,0.029]	[-0.180,0.046]	[-0.082,0.092]	[-0.1392,0.0082]	[-0.070,0.055]	[-0.039,0.083]	[-0.042,0.074]	[-0.091,0.027]	[-0.075,0.056]	[-0.046,0.057]
FE AME	- 0.0139	- 0.0677	-0.0233	- 0.0464	-0.1416	- 0.061	0.0347	0.0321	-0.0998	0.0300	0.0989
	[-0.1400,0.1122]	[-0.1480,0.0126]	[-0.1603,0.1138]	[-0.1922,0.0993]	[-0.2918,0.0087]	[-0.3077,0.1856]	[-0.0804,0.1499]	[-0.0735,0.1378]	[-0.2013,0.0017]	[-0.1268,0.1868]	[-0.0017,0.1995]
Very High											
MLM AME	0.042	- 0.014	- 0.070	0.018	- 0.0638	- 0.018	- 0.021	- 0.009	- 0.031	0.019	- 0.006
	[-0.048,0.133]	[-0.064,0.036]	[-0.189,0.050]	[-0.063,0.099]	[-0.1361,0.0085]	[-0.081,0.045]	[-0.074,0.033]	[-0.061,0.042]	[-0.087,0.026]	[-0.039,0.077]	[-0.058,0.046]
FE AME	0.0400	- 0.0566	- 0.0469	- 0.0248	- 0.1397	- 0.0555	0.0328	0.0204	- 0.1137*	0.0527	0.0977
	[-0.0957,0.1757]	[-0.1463,0.0331]	[-0.2099,0.1160]	[-0.1687,0.1191]	[-0.3155,0.0362]	[-0.3091,0.1981]	[-0.0939,0.1595]	[-0.0935,0.1343]	[-0.2175,-0.0098]	[-0.1061,0.2114]	[-0.0033,0.1987]

Notes: Logit models used for mult-level models. Cluster robust linear probability models used for fixed-effects models.

*p<0.05,**p<0.01,***p<0.001

Table 5.19a: Multi-Level Estimates of the Effect of CCNC on Yearly Health Care Utilization, by Baseline Values

	>=1 IP Admission				>=1 ED Visit						# PCP Visits					
	Low (<12.5%)		High (>=12.5%)		Low (<6%)		Medium (6-17%)		High (>17%)		Low (<4.2)		Medium (4.2-5.3)		High (>5.3)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	IRR	95% CI	IRR	95% CI	IRR	95% CI
CCNC	0.97	[0.76,1.24]	1.07	[0.88,1.29]	0.92	[0.69,1.23]	1.03	[0.82,1.29]	1.03	[0.88,1.21]	0.95*	[0.91,1.00]	0.94*	[0.90,0.99]	0.99	[0.95,1.02]
	(AME = -0.002)		(AME = 0.0057)		(AME = -0.0092)		(AME = 0.0034)		(AME = 0.0046)		(AME = -0.152)		(AME = -0.2093)		(AME = -0.0524)	
Ever CCNC	1.08	[0.83,1.39]	0.93	[0.77,1.13]	1.19	[0.88,1.63]	1.10	[0.85,1.42]	1.00	[0.84,1.19]	1.09	[1.00,1.19]	0.94	[0.86,1.02]	0.97	[0.89,1.05]
CCNC Early Adopter	1.11	[0.94,1.30]	1.14	[0.97,1.34]	1.31*	[1.05,1.63]	0.96	[0.79,1.17]	1.26**	[1.09,1.45]	0.93	[0.85,1.03]	1.12**	[1.03,1.22]	1.04	[0.95,1.13]
Person-level controls																
Age	0.96	[0.91,1.01]	0.96	[0.91,1.01]	0.93*	[0.88,0.99]	0.96	[0.92,1.00]	0.94**	[0.90,0.98]	1.01	[1.00,1.02]	1.00	[0.99,1.01]	1.00	[0.99,1.01]
Age^2	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]
Male	0.96	[0.87,1.06]	0.89*	[0.80,0.99]	0.79***	[0.70,0.88]	0.74***	[0.67,0.81]	0.73***	[0.67,0.80]	0.82***	[0.81,0.84]	0.79***	[0.78,0.81]	0.76***	[0.75,0.77]
Charlson Index	3.36***	[3.11,3.64]	2.81***	[2.60,3.04]	1.79***	[1.61,2.00]	1.80***	[1.67,1.94]	1.87***	[1.73,2.03]	1.51***	[1.48,1.53]	1.41***	[1.38,1.43]	1.45***	[1.43,1.47]
Charlson Index^2	0.92***	[0.91,0.93]	0.95***	[0.94,0.95]	0.96***	[0.95,0.97]	0.96***	[0.95,0.97]	0.95***	[0.94,0.96]	0.97***	[0.97,0.97]	0.98***	[0.97,0.98]	0.98***	[0.98,0.98]
Eligibility (omitted = subscriber)																
Spouse	1.22**	[1.06,1.41]	1.26**	[1.09,1.46]	0.86	[0.71,1.04]	0.98	[0.85,1.13]	0.99	[0.87,1.13]	0.98	[0.96,1.01]	1.06***	[1.03,1.09]	1.14***	[1.11,1.17]
Other	1.00	[0.44,2.27]	0.38	[0.12,1.16]	0.37	[0.13,1.06]	0.56	[0.30,1.05]	0.59	[0.27,1.29]	0.86	[0.71,1.06]	0.70**	[0.56,0.89]	0.79**	[0.69,0.92]
Plan Type (omitted = CMM)																
Smart Choice	0.73**	[0.59,0.90]	0.91	[0.72,1.14]	0.72*	[0.54,0.97]	0.74**	[0.61,0.91]	0.77**	[0.64,0.92]	1.01	[0.96,1.06]	0.93**	[0.88,0.97]	1.08***	[1.04,1.12]
Smart Choice Basic	0.73**	[0.59,0.91]	0.92	[0.72,1.17]	0.80	[0.59,1.09]	0.79*	[0.64,0.97]	0.90	[0.74,1.08]	0.94*	[0.90,0.99]	0.89***	[0.85,0.94]	1.00	[0.96,1.04]
Smart Choice Plus	1.17	[0.90,1.52]	1.47**	[1.10,1.95]	0.95	[0.66,1.37]	0.84	[0.65,1.08]	0.96	[0.75,1.22]	1.15***	[1.08,1.22]	1.03	[0.97,1.09]	1.22***	[1.17,1.28]
Practice and county-level controls																
# Primary Care Providers	1.00	[0.99,1.01]	1.00	[1.00,1.01]	0.99	[0.97,1.02]	1.00	[0.99,1.00]	1.00	[0.99,1.01]	1.00*	[0.99,1.00]	1.00	[1.00,1.01]	1.00	[1.00,1.00]
Multisite Practice	0.89	[0.35,2.29]	0.59	[0.31,1.12]	1.10	[0.42,2.87]	0.88	[0.40,1.92]	0.62	[0.30,1.31]	—	—	—	—	1.07	[0.81,1.42]
Rural-Urban																
Non-urban, Non-rural	1.10	[0.94,1.29]	1.07	[0.91,1.26]	1.45***	[1.18,1.78]	1.13	[0.92,1.39]	1.18*	[1.02,1.35]	0.93	[0.86,1.02]	1.02	[0.94,1.10]	1.06	[0.99,1.15]
Rural	0.84	[0.52,1.34]	0.74	[0.46,1.18]	0.93	[0.59,1.47]	1.93**	[1.18,3.15]	1.00	[0.66,1.53]	1.02	[0.81,1.27]	0.89	[0.75,1.05]	0.94	[0.73,1.20]
Community-based Practice	0.74**	[0.60,0.91]	0.80	[0.64,1.00]	1.02	[0.68,1.53]	1.09	[0.87,1.35]	0.87	[0.71,1.06]	0.91	[0.77,1.08]	0.84**	[0.75,0.94]	0.85**	[0.76,0.96]
County Proportion Poverty	0.99	[0.16,6.28]	1.18	[0.18,7.96]	0.34	[0.03,3.81]	4.15	[0.50,34.70]	0.32	[0.06,1.73]	4.24***	[2.03,8.84]	7.60***	[3.65,15.85]	1.81	[0.96,3.39]
Primary Care Providers/10,000 Population	1.00	[0.99,1.01]	1.00	[0.98,1.01]	1.01	[0.99,1.03]	1.01	[0.99,1.02]	0.99	[0.98,1.00]	1.00	[1.00,1.01]	1.00	[0.99,1.01]	1.00	[1.00,1.01]
County Proportion Race/Ethnicity																
Non-white, not Hispanic	1.10	[0.67,1.80]	0.95	[0.54,1.67]	1.67	[0.91,3.07]	1.04	[0.54,1.98]	1.64*	[1.05,2.57]	0.94	[0.75,1.18]	0.72**	[0.57,0.92]	1.06	[0.84,1.34]
Hispanic	1.55	[0.53,4.50]	0.94	[0.32,2.74]	1.78	[0.47,6.71]	1.42	[0.44,4.61]	2.02	[0.76,5.37]	1.06	[0.61,1.86]	1.47	[0.92,2.35]	1.03	[0.66,1.62]
Year																
2005	3.06***	[2.39,3.93]	0.46***	[0.38,0.56]	61.76***	[22.75,167.65]	1.37**	[1.12,1.67]	0.61***	[0.52,0.71]	1.21***	[1.15,1.26]	0.90***	[0.86,0.95]	0.82***	[0.79,0.85]
2006	3.27***	[2.55,4.19]	0.43***	[0.36,0.53]	57.74***	[21.25,156.87]	1.49***	[1.22,1.82]	0.59***	[0.50,0.69]	1.24***	[1.18,1.30]	0.88***	[0.84,0.92]	0.78***	[0.76,0.81]
2007	3.27***	[2.54,4.20]	0.41***	[0.33,0.50]	62.61***	[23.00,170.44]	1.38**	[1.13,1.68]	0.59***	[0.50,0.70]	1.30***	[1.23,1.36]	0.95*	[0.91,1.00]	0.80***	[0.77,0.83]
2008	2.92***	[2.27,3.76]	0.37***	[0.30,0.45]	67.60***	[24.82,184.09]	1.50***	[1.23,1.83]	0.58***	[0.50,0.69]	1.34***	[1.28,1.40]	0.95*	[0.91,1.00]	0.78***	[0.75,0.81]
Constant	0.02***	[0.01,0.08]	0.24*	[0.06,0.93]	0.01***	[0.00,0.09]	0.25*	[0.09,0.75]	1.80	[0.63,5.09]	1.19	[0.85,1.66]	2.16***	[1.57,2.97]	3.03***	[2.34,3.92]
Average practice intercept	0.24***	[0.17,0.33]	0.14***	[0.07,0.29]	0.30***	[0.22,0.40]	0.23***	[0.18,0.31]	0.23***	[0.17,0.30]	0.22***	[0.20,0.25]	0.17***	[0.15,0.20]	0.24***	[0.21,0.27]
N	27487		17480		11349		16810		16808		16095		12266		16606	

Notes : Logit models used for IP and ED visits. Zero-truncated Poisson with reintroduced zeros used for PCP and OP vists. Robust OLS used for Continuity of Care.
Continuity of Care models only for patients with >=3 OP visits during the year.
*p<0.05,**p<0.01,***p<0.001

Table 5.19a: Continued

	# Total OP Visits						Continuity of Care					
	Low (<6.5)		Medium (6.5-8.1)		High (>8.1)		Low (<0.46)		Medium (0.46 -0.58)		High (>0.58)	
	IRR	95% CI	IRR	95% CI	IRR	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI
CCNC	0.98	[0.94,1.01]	0.97	[0.94,1.00]	0.97*	[0.94,1.00]	-0.0153	[-0.0455,0.0148]	0.0214	[-0.0006,0.0435]	-0.0148	[-0.0385,0.0089]
	(AME = -0.1322)		(AME = -0.1924)		(AME = -0.2348)		(AME = -0.0047)		(AME = 0.0073)		(AME =-0.013)	
Ever CCNC	1.00	[0.93,1.07]	1.01	[0.95,1.08]	0.97	[0.91,1.03]	0.027	[-0.0024,0.0564]	0.0029	[-0.0210,0.0269]	0.0259	[-0.0040,0.0557]
CCNC Early Adopter	0.91*	[0.84,0.98]	1.03	[0.97,1.10]	1.05	[0.98,1.12]	0.0105	[-0.0172,0.0381]	-0.0079	[-0.0336,0.0179]	0.0019	[-0.0237,0.0275]
Person-level controls												
Age	0.97***	[0.97,0.98]	0.98***	[0.98,0.99]	0.99***	[0.98,0.99]	0.0071*	[0.0011,0.0130]	0.0180***	[0.0126,0.0233]	0.0112**	[0.0042,0.0183]
Age^2	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	-0.0001**	[-0.0001,-0.0000]	-0.0002***	[-0.0003,-0.0001]	-0.0001***	[-0.0002,-0.0001]
Male	0.76***	[0.75,0.78]	0.76***	[0.75,0.77]	0.74***	[0.73,0.75]	0.0682***	[0.0558,0.0807]	0.0617***	[0.0467,0.0768]	0.0725***	[0.0586,0.0864]
Charlson Index	1.50***	[1.48,1.52]	1.47***	[1.45,1.48]	1.46***	[1.44,1.47]	-0.0541***	[-0.0690,-0.0392]	-0.0478***	[-0.0571,-0.0384]	-0.0616***	[-0.0709,-0.0523]
Charlson Index^2	0.97***	[0.97,0.98]	0.98***	[0.98,0.98]	0.98***	[0.98,0.98]	0.0042***	[0.0033,0.0050]	0.0023***	[0.0014,0.0033]	0.0031***	[0.0020,0.0041]
Eligibility (omitted = subscriber)												
Spouse	1.12***	[1.10,1.15]	1.07***	[1.05,1.09]	1.10***	[1.08,1.12]	-0.0075	[-0.0238,0.0088]	-0.0245**	[-0.0428,-0.0062]	-0.0362***	[-0.0573,-0.0150]
Other	0.78**	[0.66,0.91]	0.76***	[0.66,0.87]	0.85**	[0.76,0.95]	0.0096	[-0.0652,0.0844]	0.0079	[-0.0885,0.1043]	-0.0429	[-0.1510,0.0652]
Plan Type (omitted = CMM)												
Smart Choice	1.00	[0.96,1.03]	1.00	[0.97,1.03]	1.10***	[1.06,1.13]	-0.0246	[-0.0567,0.0075]	-0.0024	[-0.0286,0.0239]	-0.0004	[-0.0290,0.0282]
Smart Choice Basic	0.88***	[0.85,0.92]	0.92***	[0.89,0.95]	0.98	[0.95,1.01]	0.009	[-0.0251,0.0431]	0.0142	[-0.0139,0.0422]	0.0349*	[0.0037,0.0661]
Smart Choice Plus	1.13***	[1.08,1.19]	1.15***	[1.10,1.19]	1.20***	[1.16,1.24]	-0.0253	[-0.0605,0.0100]	-0.0052	[-0.0402,0.0299]	-0.0205	[-0.0554,0.0145]
Practice and county-level controls												
# Primary Care Providers	1.00	[1.00,1.01]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	0.0002	[-0.0001,0.0006]	-0.0009	[-0.0020,0.0002]	-0.0032**	[-0.0055,-0.0008]
Multisite Practice	—	—	0.78	[0.58,1.03]	1.13	[0.87,1.45]	—	—	0.0859*	[0.0120,0.1598]	0.0059	[-0.0621,0.0740]
Rural-Urban												
Non-urban, Non-rural	0.93*	[0.87,0.99]	0.99	[0.93,1.05]	1.02	[0.96,1.08]	0.0073	[-0.0182,0.0328]	0.0240*	[0.0010,0.0470]	0.0171	[-0.0071,0.0412]
Rural	0.92	[0.77,1.10]	0.87*	[0.76,0.99]	0.85	[0.72,1.00]	0.1086**	[0.0304,0.1868]	0.0816***	[0.0355,0.1277]	0.0119	[-0.0653,0.0891]
Community-based Practice	0.99	[0.83,1.18]	0.94	[0.86,1.02]	0.91*	[0.84,0.99]	0.0590***	[0.0336,0.0843]	-0.0296	[-0.0650,0.0058]	-0.048	[-0.1044,0.0084]
County Proportion Poverty	1.74	[0.98,3.09]	1.46	[0.86,2.45]	1.21	[0.74,1.99]	0.0635	[-0.1834,0.3103]	0.1352	[-0.0965,0.3670]	0.0376	[-0.2326,0.3079]
Primary Care Providers/10,000 Population	1.00	[0.99,1.00]	1.00	[0.99,1.00]	1.00	[0.99,1.00]	-0.0006	[-0.0027,0.0015]	0.0011	[-0.0008,0.0029]	0.0026**	[0.0009,0.0044]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.92	[0.77,1.10]	0.91	[0.76,1.08]	1.09	[0.91,1.30]	0.0525	[-0.0271,0.1322]	-0.0105	[-0.0814,0.0604]	-0.0138	[-0.0888,0.0612]
Hispanic	0.57*	[0.37,0.88]	1.19	[0.82,1.73]	0.88	[0.62,1.25]	0.096	[-0.1033,0.2952]	-0.0478	[-0.1857,0.0902]	0.0674	[-0.0965,0.2313]
Year												
2005	1.30***	[1.26,1.35]	1.01	[0.98,1.04]	0.87***	[0.84,0.89]	0.0539***	[0.0303,0.0775]	-0.0419***	[-0.0593,-0.0245]	-0.1345***	[-0.1568,-0.1122]
2006	1.31***	[1.26,1.37]	1.00	[0.97,1.03]	0.85***	[0.82,0.88]	0.0422**	[0.0169,0.0674]	-0.0483***	[-0.0665,-0.0302]	-0.1450***	[-0.1676,-0.1224]
2007	1.41***	[1.36,1.47]	1.06***	[1.03,1.09]	0.89***	[0.87,0.92]	0.0308*	[0.0040,0.0575]	-0.0632***	[-0.0805,-0.0459]	-0.1774***	[-0.2017,-0.1531]
2008	1.45***	[1.40,1.51]	1.08***	[1.05,1.12]	0.89***	[0.86,0.92]	0.0223	[-0.0050,0.0495]	-0.0745***	[-0.0933,-0.0557]	-0.1851***	[-0.2097,-0.1606]
Constant	5.44***	[4.10,7.23]	5.61***	[4.55,6.91]	6.25***	[5.11,7.63]	0.1939*	[0.0431,0.3448]	0.1708*	[0.0243,0.3172]	0.4739***	[0.2980,0.6497]
Average practice intercept	0.19***	[0.17,0.21]	0.13***	[0.11,0.15]	0.18***	[0.16,0.20]	-2.9997***	[-3.1772,-2.8221]	-3.0886***	[-3.2668,-2.9104]	-2.9894***	[-3.1701,-2.8086]
N	13525		16015		15427		13600		12731		11776	

Notes : Logit models used for IP and ED visits. Zero-truncated Poisson with reintroduced zeros used for PCP and OP vists. Robust OLS used for Continuity of Care.
Continuity of Care models only for patients with >=3 OP visits during the year.
*p<0.05,**p<0.01,***p<0.001

Table 5.19b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models, by Baseline Values

	>=1 IP		>=1 ED			# PCP			# OP			COC		
	Low	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
CCNC														
MLM AME	- 0.002	0.0057	- 0.009	0.003	0.005	- 0.152*	- 0.209*	- 0.05	- 0.132	- 0.192	- 0.235*	- 0.005	0.007	- 0.013
	[-0.018,0.014]	[-0.012,0.023]	[-0.040,0.022]	[-0.026,0.033]	[-0.020,0.029]	[-0.2941,-0.0099]	[-0.373,-0.045]	[-0.21,0.10]	[-0.346,0.081]	[-0.412,0.027]	[-0.446,-0.023]	[-0.031,0.022]	[-0.022,0.037]	[-0.038,0.012]
FE AME	0.0038	0.0117	0.0190	0.0010	0.0114	- 0.1028	- 0.2013	- 0.1049	- 0.1561	- 0.1172	- 0.2329	- 0.0151	0.0267*	- 0.015
	[-0.0128,0.0204]	[-0.0118,0.0352]	[-0.0051,0.0431]	[-0.0262,0.0282]	[-0.0126,0.0354]	[-0.2951,0.0895]	[-0.5558,0.1532]	[-0.4444,0.2347]	[-0.5258,0.2136]	[-0.4669,0.2325]	[-0.6987,0.2329]	[-0.0466,0.0163]	[0.0009,0.0525]	[-0.0405,0.0104]

Notes: For multi-level models: logit models used for IP and ED visits, zero-truncated Poisson with reintroduced zeros used for PCP and OP vists, robust OLS used for Continuity of Care. For fixed-effects models: Cluster-robust LPMs used for IP and ED visits, OLS used for PCP and OP visits and Contintinuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.20a: Multi-Level Estimates of the Moderating Effect of CCNC Patient Load on Yearly Health Care Utilization, by Baseline Values

	>=1 IP Admission				>=1 ED Visit				# PCP Visits					
	Low (<12.5%)		High (>=12.5%)		Low (<14%)		High (>=14%)		Low (<4.3)		Medium (4.3-5.5)		High (>5.5)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	IRR	95% CI	IRR	95% CI	IRR	95% CI
CCNC Patients (omitted = Very Low)														
Low	0.78*	[0.61,0.99]	1.02	[0.77,1.35]	1.11	[0.86,1.44]	1.16	[0.90,1.50]	1.02	[0.93,1.11]	1.00	[0.91,1.10]	0.90*	[0.81,1.00]
	(AME = -0.0188)		(AME = 0.0015)		(AME = 0.0132)		(AME = 0.0207)		(AME = 0.0583)		(AME = -0.0011)		(AME = -0.5202)	
Medium	0.88	[0.68,1.12]	1.04	[0.78,1.39]	1.19	[0.91,1.54]	1.34*	[1.03,1.74]	0.93	[0.83,1.04]	1.05	[0.94,1.16]	0.83**	[0.74,0.94]
	(AME = -0.0103)		(AME = 0.003)		(AME = 0.0211)		(AME = 0.0412)		(AME = -0.2285)		(AME = 0.1658)		(AME = -0.8275)	
High	0.89	[0.69,1.15]	1.26	[0.93,1.70]	1.31	[0.99,1.74]	1.20	[0.91,1.57]	0.93	[0.83,1.04]	1.06	[0.94,1.19]	0.87*	[0.77,0.98]
	(AME = -0.009)		(AME = 0.0203)		(AME = 0.0351)		(AME = 0.0249)		(AME = -0.2441)		(AME = 0.1987)		(AME = -0.6473)	
Very High	0.76*	[0.59,0.97]	1.05	[0.80,1.37]	1.42*	[1.09,1.86]	1.25	[0.96,1.63]	1.01	[0.90,1.13]	0.96	[0.85,1.08]	0.87*	[0.77,0.98]
	(AME = -0.0205)		(AME = 0.0042)		(AME = 0.0461)		(AME = 0.0313)		(AME = 0.0262)		(AME = -0.1493)		(AME = -0.6692)	
CCNC Early Adopter	1.10	[0.97,1.25]	1.13	[0.95,1.35]	1.08	[0.93,1.26]	1.22*	[1.05,1.43]	0.98	[0.89,1.08]	1.13**	[1.03,1.24]	0.99	[0.89,1.10]
Person-level controls														
Age	0.99	[0.92,1.06]	0.97	[0.90,1.04]	0.94*	[0.89,0.99]	0.96	[0.91,1.00]	1.00	[0.99,1.01]	1.03***	[1.02,1.04]	0.99	[0.98,1.01]
Age^2	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00***	[1.00,1.00]	1.00	[1.00,1.00]
Male	0.92	[0.81,1.04]	0.95	[0.82,1.10]	0.74***	[0.67,0.82]	0.73***	[0.66,0.80]	0.81***	[0.79,0.83]	0.75***	[0.73,0.77]	0.78***	[0.76,0.80]
Charlson Index	3.41***	[3.08,3.77]	2.70***	[2.45,2.97]	1.82***	[1.66,1.99]	1.75***	[1.62,1.90]	1.45***	[1.41,1.48]	1.41***	[1.38,1.44]	1.46***	[1.44,1.49]
Charlson Index^2	0.92***	[0.91,0.93]	0.95***	[0.94,0.96]	0.96***	[0.95,0.97]	0.96***	[0.95,0.97]	0.97***	[0.97,0.98]	0.98***	[0.98,0.98]	0.98***	[0.97,0.98]
Eligibility (omitted = subscriber)														
Spouse	1.33**	[1.12,1.58]	1.45***	[1.20,1.77]	0.86	[0.73,1.03]	1.00	[0.86,1.17]	0.98	[0.94,1.02]	1.11***	[1.07,1.16]	1.19***	[1.16,1.23]
Other	1.78	[0.67,4.69]	0.39	[0.10,1.50]	0.43	[0.18,1.02]	0.82	[0.41,1.66]	0.75*	[0.59,0.96]	0.82	[0.62,1.08]	0.88	[0.72,1.08]
Plan Type (omitted = CMM)														
Smart Choice	0.63***	[0.48,0.82]	1.09	[0.76,1.58]	0.65**	[0.51,0.85]	0.77*	[0.61,0.97]	0.99	[0.92,1.07]	0.83***	[0.78,0.87]	1.11***	[1.06,1.17]
Smart Choice Basic	0.65**	[0.49,0.86]	1.13	[0.78,1.66]	0.73*	[0.56,0.95]	0.94	[0.75,1.19]	0.92*	[0.85,0.99]	0.79***	[0.74,0.83]	1.02	[0.96,1.08]
Smart Choice Plus	1.21	[0.87,1.69]	1.70*	[1.10,2.63]	0.96	[0.70,1.32]	1.08	[0.81,1.44]	1.15**	[1.05,1.26]	0.90**	[0.84,0.96]	1.26***	[1.18,1.34]
Practice and county-level controls														
# Primary Care Providers	1.00	[0.99,1.01]	1.00	[1.00,1.01]	1.00	[0.98,1.01]	1.00	[0.99,1.00]	0.99**	[0.99,1.00]	1.00	[1.00,1.01]	1.00	[1.00,1.00]
Multisite Practice	0.82	[0.32,2.10]	0.61	[0.29,1.30]	1.04	[0.33,3.21]	0.64	[0.32,1.29]	—	—	0.93	[0.59,1.48]	1.17	[0.76,1.80]
Rural-Urban														
Non-urban, Non-rural	1.13	[0.97,1.32]	1.01	[0.83,1.24]	1.15	[0.96,1.39]	1.12	[0.93,1.34]	0.98	[0.87,1.10]	0.98	[0.89,1.09]	0.96	[0.86,1.07]
Rural	1.04	[0.74,1.46]	0.52*	[0.31,0.87]	1.05	[0.76,1.46]	0.77	[0.49,1.23]	1.05	[0.85,1.28]	0.85	[0.71,1.01]	0.78	[0.60,1.02]
Community-based Practice	0.94	[0.78,1.14]	0.75	[0.55,1.01]	1.09	[0.72,1.64]	0.93	[0.73,1.18]	1.01	[0.79,1.30]	0.98	[0.81,1.18]	0.95	[0.79,1.14]
County Proportion Poverty	0.19	[0.03,1.18]	2.51	[0.19,32.82]	0.19	[0.02,1.64]	0.75	[0.09,6.45]	0.98	[0.38,2.51]	3.46*	[1.34,8.93]	1.95	[0.84,4.50]
Primary Care Providers/10,000 Population	1.00	[0.98,1.01]	1.00	[0.98,1.02]	1.01	[0.99,1.02]	1.00	[0.98,1.01]	1.00	[0.99,1.01]	1.00	[0.99,1.01]	1.00	[0.99,1.01]
County Proportion Race/Ethnicity														
Non-white, not Hispanic	1.23	[0.75,2.01]	1.03	[0.49,2.18]	2.14**	[1.21,3.77]	1.73	[0.94,3.17]	1.07	[0.79,1.45]	0.88	[0.66,1.18]	0.91	[0.66,1.26]
Hispanic	1.47	[0.60,3.63]	0.44	[0.12,1.65]	1.03	[0.37,2.89]	1.33	[0.38,4.59]	0.70	[0.37,1.32]	1.83*	[1.08,3.12]	0.78	[0.40,1.50]
Year														
2005	1.83*	[1.12,2.99]	0.42**	[0.23,0.75]	3.11***	[1.67,5.78]	0.78	[0.56,1.09]	1.08	[0.95,1.23]	0.81***	[0.75,0.88]	0.84***	[0.76,0.93]
2006	2.08**	[1.28,3.37]	0.39**	[0.22,0.70]	3.19***	[1.72,5.90]	0.76	[0.55,1.05]	1.16*	[1.02,1.32]	0.83***	[0.77,0.90]	0.80***	[0.72,0.88]
2007	2.12**	[1.31,3.44]	0.37***	[0.21,0.65]	3.16***	[1.71,5.84]	0.78	[0.56,1.07]	1.19*	[1.04,1.35]	0.85***	[0.78,0.92]	0.81***	[0.73,0.89]
2008	1.83*	[1.13,2.97]	0.34***	[0.19,0.60]	3.55***	[1.92,6.56]	0.72*	[0.52,1.00]	1.23**	[1.08,1.40]	0.86***	[0.79,0.93]	0.78***	[0.70,0.86]
Constant	0.03***	[0.01,0.16]	0.18	[0.03,1.23]	0.27	[0.06,1.20]	0.71	[0.22,2.29]	2.10**	[1.32,3.36]	1.21	[0.79,1.84]	3.60***	[2.41,5.39]
Average practice intercept	0.00	[0.00,0.00]	0.00	[0.00,0.00]	0.34***	[0.26,0.43]	0.33***	[0.26,0.41]	0.30***	[0.26,0.34]	0.22***	[0.18,0.25]	0.29***	[0.25,0.34]
N	15802		9579		12058		13323		8244		8651		8486	

Notes: Logit models used for IP and ED visits. Zero-truncated Poisson with reintroduced zeros used for PCP and OP vists. Robust OLS used for Continuity of Care.
Continuity of Care models only for patients with >=3 OP visits during the year.
*p<0.05,**p<0.01,***p<0.001

Table 5.20a: Continued

	# Total OP Visits						Continuity of Care					
	Low (<6.7)		Medium (6.7-8.4)		High (>8.4)		Low (<0.46)		Medium (0.46 -0.58)		High (>0.58)	
	IRR	95% CI	IRR	95% CI	IRR	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI
CCNC Patients (omitted = Very Low)												
Low	0.94	[0.88,1.01]	1.07	[1.00,1.16]	0.92*	[0.86,1.00]	0.0119	[-0.0209,0.0446]	0.0253	[-0.0027,0.0533]	-0.0094	[-0.0528,0.0339]
	(AME = -0.3579)		(AME = 0.4673)		(AME = -0.6041)		(AME = 0.0119)		(AME = 0.0253)		(AME = -0.0094)	
Medium	0.89**	[0.82,0.97]	1.06	[0.98,1.16]	0.89**	[0.82,0.97]	0.0294	[-0.0029,0.0618]	0.0502***	[0.0223,0.0782]	0.0087	[-0.0359,0.0532]
	(AME = -0.6736)		(AME = 0.3949)		(AME = -0.8903)		(AME = 0.0294)		(AME = 0.0502)		(AME = 0.0087)	
High	0.90*	[0.82,0.98]	1.11*	[1.02,1.22]	0.89**	[0.81,0.97]	0.0414*	[0.0085,0.0743]	0.0393	[-0.0032,0.0818]	0.0082	[-0.0353,0.0517]
	(AME = -0.665)		(AME = 0.7063)		(AME =-0.9106)		(AME = 0.0414)		(AME = 0.0393)		(AME = 0.0082)	
Very High	0.90*	[0.82,0.99]	1.04	[0.95,1.14]	0.88**	[0.81,0.97]	0.0599***	[0.0250,0.0948]	0.0680***	[0.0293,0.1068]	0.0064	[-0.0373,0.0500]
	(AME = -0.6424)		(AME = 0.2616)		(AME = -0.9298)		(AME = 0.0599)		(AME = 0.068)		(AME = 0.0064)	
CCNC Early Adopter	1.00	[0.93,1.08]	0.96	[0.90,1.03]	1.04	[0.95,1.13]	0.0024	[-0.0237,0.0284]	-0.0034	[-0.0306,0.0237]	-0.0024	[-0.0294,0.0247]
Person-level controls												
Age	0.98***	[0.97,0.99]	1.00	[0.99,1.01]	0.99	[0.98,1.00]	0.0127**	[0.0035,0.0219]	0.0139***	[0.0075,0.0203]	0.0058	[-0.0027,0.0144]
Age^2	1.00***	[1.00,1.00]	1.00*	[1.00,1.00]	1.00*	[1.00,1.00]	-0.0001**	[-0.0002,-0.0000]	-0.0002***	[-0.0002,-0.0001]	-0.0001	[-0.0002,0.0000]
Male	0.75***	[0.74,0.76]	0.75***	[0.74,0.76]	0.73***	[0.72,0.74]	0.0665***	[0.0502,0.0828]	0.0621***	[0.0402,0.0839]	0.0819***	[0.0662,0.0975]
Charlson Index	1.50***	[1.47,1.52]	1.46***	[1.44,1.48]	1.46***	[1.44,1.48]	-0.0534***	[-0.0788,-0.0281]	-0.0385***	[-0.0497,-0.0272]	-0.0524***	[-0.0630,-0.0418]
Charlson Index^2	0.97***	[0.97,0.98]	0.98***	[0.98,0.98]	0.98***	[0.98,0.98]	0.0044***	[0.0032,0.0057]	0.0015*	[0.0002,0.0027]	0.0021***	[0.0010,0.0031]
Eligibility (omitted = subscriber)												
Spouse	1.14***	[1.11,1.17]	1.06***	[1.03,1.09]	1.15***	[1.12,1.18]	-0.0008	[-0.0213,0.0196]	-0.0299*	[-0.0534,-0.0063]	-0.0546***	[-0.0796,-0.0296]
Other	0.68***	[0.55,0.83]	0.79**	[0.66,0.94]	0.90	[0.77,1.05]	0.0754	[-0.0118,0.1627]	0.0096	[-0.1136,0.1328]	-0.0402	[-0.2751,0.1948]
Plan Type (omitted = CMM)												
Smart Choice	0.99	[0.94,1.05]	0.94**	[0.90,0.98]	1.07**	[1.03,1.12]	-0.0099	[-0.0499,0.0302]	0.0042	[-0.0312,0.0397]	0.0112	[-0.0251,0.0475]
Smart Choice Basic	0.87***	[0.82,0.91]	0.87***	[0.83,0.91]	0.96*	[0.91,1.00]	0.0147	[-0.0294,0.0589]	0.0261	[-0.0104,0.0626]	0.0396	[-0.0004,0.0797]
Smart Choice Plus	1.14***	[1.07,1.21]	1.15***	[1.09,1.21]	1.15***	[1.09,1.21]	-0.0268	[-0.0780,0.0243]	-0.0097	[-0.0535,0.0342]	-0.0191	[-0.0675,0.0293]
Practice and county-level controls												
# Primary Care Providers	1.00	[1.00,1.01]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	0.0004	[-0.0001,0.0009]	-0.0021**	[-0.0036,-0.0007]	-0.0023	[-0.0054,0.0008]
Multisite Practice	—	—	0.73	[0.52,1.02]	1.06	[0.75,1.50]	0.1131*	[0.0269,0.1993]	—	—	0.0042	[-0.0793,0.0877]
Rural-Urban												
Non-urban, Non-rural	0.92	[0.85,1.00]	0.95	[0.88,1.03]	0.92	[0.84,1.01]	0.0304	[-0.0018,0.0626]	0.0499**	[0.0195,0.0804]	0.0193	[-0.0094,0.0481]
Rural	0.84*	[0.72,0.99]	0.84*	[0.71,0.98]	0.75**	[0.63,0.90]	0.1061***	[0.0506,0.1615]	0.0802**	[0.0258,0.1345]	0.0353	[-0.0385,0.1090]
Community-based Practice	1.08	[0.87,1.33]	0.95	[0.84,1.08]	0.93	[0.79,1.09]	0.0739***	[0.0337,0.1141]	-0.0604**	[-0.1002,-0.0206]	-0.031	[-0.0980,0.0360]
County Proportion Poverty	1.39	[0.67,2.86]	1.17	[0.61,2.24]	0.49	[0.24,1.00]	0.1181	[-0.2070,0.4432]	-0.117	[-0.4279,0.1940]	-0.2006	[-0.5297,0.1284]
Primary Care Providers/10,000 Population	1.00	[0.99,1.00]	0.99*	[0.98,1.00]	1.00	[0.99,1.01]	0.0003	[-0.0026,0.0032]	0.0015	[-0.0011,0.0042]	0.002	[-0.0009,0.0049]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.84	[0.67,1.07]	1.00	[0.81,1.24]	1.13	[0.86,1.50]	-0.0341	[-0.1239,0.0557]	0.0954*	[0.0104,0.1803]	0.0331	[-0.0543,0.1204]
Hispanic	0.69	[0.43,1.10]	1.26	[0.80,1.98]	0.58*	[0.34,0.97]	0.0844	[-0.1383,0.3070]	0.0227	[-0.1360,0.1814]	0.0054	[-0.1650,0.1758]
Year												
2005	1.19***	[1.08,1.32]	0.98	[0.92,1.04]	0.93	[0.84,1.02]	0.0318	[-0.0114,0.0751]	-0.0226	[-0.0491,0.0040]	-0.0969***	[-0.1543,-0.0394]
2006	1.24***	[1.12,1.36]	0.99	[0.94,1.05]	0.91	[0.83,1.00]	0.0189	[-0.0252,0.0630]	-0.023	[-0.0524,0.0065]	-0.0972***	[-0.1513,-0.0431]
2007	1.33***	[1.21,1.47]	1.03	[0.97,1.09]	0.93	[0.84,1.03]	0.001	[-0.0436,0.0456]	-0.0474***	[-0.0746,-0.0202]	-0.1364***	[-0.1942,-0.0785]
2008	1.38***	[1.25,1.52]	1.04	[0.98,1.10]	0.94	[0.86,1.04]	-0.0088	[-0.0534,0.0357]	-0.0528***	[-0.0811,-0.0245]	-0.1438***	[-0.2016,-0.0860]
Constant	4.75***	[3.29,6.85]	4.33***	[3.23,5.81]	7.27***	[5.24,10.08]	0.0572	[-0.1506,0.2649]	0.2151*	[0.0371,0.3932]	0.5751***	[0.3644,0.7858]
Average practice intercept	0.24***	[0.21,0.27]	0.16***	[0.13,0.18]	0.24***	[0.21,0.27]	-2.9869***	[-3.2189,-2.7549]	-3.1524***	[-3.4120,-2.8929]	-2.8347***	[-3.0270,-2.6425]
N	8396		8713		8272		6648		7205		7511	

Notes : Logit models used for IP and ED visits. Zero-truncated Poisson with reintroduced zeros used for PCP and OP vists. Robust OLS used for Continuity of Care.
Continuity of Care models only for patients with >=3 OP visits during the year.
*p<0.05,**p<0.01,***p<0.001

Table 5.20b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed-Effects Models, by Baseline Values

	>=1 IP		>=1 ED		# PCP			# OP			COC		
	Low	High	Low	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
CCNC Patients (omitted=Very Low)													
Low													
MLM AME	- 0.0188* [-0.0358,-0.0018]	0.002 [-0.022,0.025]	0.013 [-0.019,0.046]	0.021 [-0.016,0.057]	0.06 [-0.24,0.36]	- 0.00 [-0.35,0.35]	- 0.520* [-0.993,-0.047]	- 0.358 [-0.789,0.073]	0.467 [-0.020,0.955]	- 0.604* [-1.179-0.029]	0.012 [-0.01,0.043]	0.025 [-0.011,0.061]	- 0.009 [-0.052,0.033]
FE AME	- 0.0054 [-0.0553,0.0445]	0.0021 [-0.0493,0.0535]	-0.0077 [-0.0764,0.0610]	-0.0268 [-0.0856,0.0320]	- 0.10 [-0.54,0.34]	- 0.07 [-0.71,0.57]	- 0.27 [-0.83,0.29]	0.00 [-0.59, 0.60]	- 0.5446 [-1.0970,0.0078]	- 1.05 [-2.30,0.21]	- 0.000 [-0.067,0.067]	0.0579* [0.0071,0.1087]	- 0.000 [-0.088,0.087]
Medium													
MLM AME	- 0.0103 [-0.0269,0.0063]	0.003 [-0.019,0.025]	0.0211 [-0.0094,0.0516]	0.0412* [0.0047,0.0776]	- 0.229 [-0.53,0.071]	0.17 [-0.19,0.52]	- 0.83** [-1.26,-0.40]	- 0.67** [-1.10,-0.25]	0.39 [-0.10,0.89]	- 0.89** [-1.43,-0.35]	0.0294* [0.00020, 0.05860]	0.050** [0.017,0.084]	0.009 [-0.032,0.049]
FE AME	0.0195 [-0.0409,0.0799]	0.0567 [-0.0145,0.1280]	0.0136 [-0.0692,0.0965]	- 0.0191 [-0.0932,0.0550]	- 0.50 [-1.19,0.20]	- 0.06 [-0.94,0.81]	- 0.37 [-1.14,0.39]	- 0.09 [-0.83,0.65]	- 0.61 [-1.95,0.72]	- 0.18 [-2.16,1.80]	- 0.014 [-0.091,0.064]	0.0683* [0.0010,0.1355]	- 0.010 [-0.112,0.092]
High													
MLM AME	- 0.009 [-0.030,0.014]	0.020 [-0.014,0.055]	0.035 [-0.011,0.081]	0.0249 [-0.021,0.071]	- 0.24 [-0.66,0.17]	0.20 [-0.32,0.72]	- 0.647* [-1.25,-0.042]	- 0.665* [-1.26,-0.070]	0.7063 [-0.00812,1.4207]	- 0.91* [-1.67,-0.15]	0.0414* [0.000044,0.082756]	0.039 [-0.010,0.089]	0.008 [-0.044,0.061]
FE AME	0.0171 [-0.0476,0.0817]	0.0400 [-0.0372,0.1172]	0.0248 [-0.0678,0.1173]	-0.0353 [-0.1168,0.0462]	- 0.42 [-1.16,0.32]	- 0.30 [-1.13,0.54]	- 0.18 [-1.04,0.67]	0.03 [-0.78,0.84]	1.27 [-0.23,2.77]	- 3.08* [-5.68,-0.49]	- 0.026 [-0.113,0.060]	0.016 [-0.082,0.113]	- 0.043 [-0.151,0.066]
Very High													
MLM AME	- 0.0205* [-0.0388,-0.0022]	0.004 [-0.020,0.029]	0.0461* [0.0041,0.0881]	0.031 [-0.011,0.073]	0.03 [-0.39,0.44]	- 0.15 [-0.59,0.29]	- 0.67* [-1.24,-0.10]	- 0.642* [-1.219,-0.066]	0.26 [-0.36,0.88]	- 0.93* [-1.64,-0.22]	0.060** [0.021,0.098]	0.068* [0.025,0.111]	0.006 [-0.042,0.055]
FE AME	0.0124 [-0.0537,0.0784]	0.0407 [-0.0387,0.1200]	0.0265 [-0.0693,0.1223]	-0.0477 [-0.1318,0.0365]	- 0.10 [-0.87,0.68]]	- 0.29 [-1.41,0.84]	- 0.20 [-1.12,0.71]	0.04 [-0.86, 0.94]	1.11 [-0.60,2.82]	- 6.04*** [-8.74,-3.33]	- 0.012 [-0.100,0.076]	0.027 [-0.078,0.132]	-0.050 [-0.161,0.061]

Notes: For multi-level models: logit models used for IP and ED visits, zero-truncated Poisson with reintroduced zeros used for PCP and OP vists, robust OLS used for Continuity of Care. For fixed-effects models: Cluster-robust LPMs used for IP and ED visits, OLS used for PCP and OP visits and Contintinuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.21a: Multi-Level Estimates of the Effect of CCNC on SHP Paid Medical Expenditures, by Baseline Values

	Total						IP				ED					
	Low (<2318)		Medium (2318-4877)		High (>4877)		Low (<1519)		High (>=1519)		Low (<5)		Medium (5-151)		High (>151)	
	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI
CCNC	-641.22	[-1721.82,439.38]	518.31	[-651.19,1687.81]	-16.92	[-1444.06,1410.22]	-163.5	[-670.10,343.09]	-114.24	[-979.21,750.73]	2.00	[-93.14,97.13]	44.94	[-45.20,135.08]	-22.53	[-146.94,101.87]
	(AME = -641.22)		(AME = 518.31)		(AME = -16.92)		(AME = -163.50)		(AME = -114.24)		(AME = 2.00)		(AME = 44.94)		(AME = -22.53)	
Ever CCNC	594.30	[-586.01,1774.62]	-215.89	[-1433.28,1001.50]	-536.35	[-2131.37,1058.68]	195.07	[-317.79,707.94]	84.27	[-821.20,989.74]	11.93	[-84.98,108.85]	73.00	[-97.03,89.57]	-8.38	[-146.67,129.91]
CCNC Early Adopter	-52.49	[-1047.47,942.49]	227.73	[-702.49,1157.94]	838.56	[-408.88,2085.99]	153.29	[-207.72,514.31]	3.28	[-665.78,672.33]	80.81*	[6.09,155.53]	-20.37	[-90.49,49.75]	124.85*	[24.23,225.48]
Person-level controls																
Age	-303.70*	[-582.29,-25.10]	-42.42	[-312.68,227.84]	-6.07	[-364.65,352.51]	-138.08*	[-263.77,-12.40]	-100.39	[-337.10,136.33]	-0.75	[-25.67,24.18]	1.96	[-20.50,24.43]	1.88	[-29.38,33.15]
Age^2	3.77*	[0.78,6.76]	0.62	[-2.27,3.50]	0.41	[-3.43,4.25]	1.58*	[0.23,2.92]	1.21	[-1.32,3.75]	-0.07	[-0.34,0.20]	-0.08	[-0.33,0.16]	0.12	[-0.45,0.21]
Male	-215.71	[-722.61,291.19]	-371.84	[-869.46,125.78]	-5.43	[-701.33,690.48]	247.44*	[16.26,478.61]	362.82	[-89.77,815.41]	-47.07*	[-91.86,-2.28]	-62.73**	[-106.21,-19.24]	-96.24**	[-153.93,-38.56]
Charlson Index	2630.29***	[2130.64,3129.95]	4697.09***	[4261.91,5132.27]	6054.68***	[5469.80,6639.55]	1522.03***	[1301.75,1742.30]	2330.99***	[1960.65,2701.34]	183.61***	[140.83,226.40]	252.16***	[213.62,290.70]	404.71***	[355.82,453.60]
Charlson Index^2	701.69***	[632.09,771.28]	447.19***	[389.47,504.91]	467.53***	[395.78,539.27]	202.36***	[171.76,232.96]	195.98***	[151.42,240.54]	-7.02*	[-12.84,-1.20]	-8.12**	[-13.26,-2.98]	-19.09***	[-25.12,-13.06]
Eligibility (omitted = subscriber)																
Spouse	2018.00***	[1221.93,2814.07]	2483.14***	[1715.51,3250.77]	1571.94**	[530.51,2613.37]	526.77**	[166.74,886.80]	218.31	[-461.05,897.68]	9.71	[-58.16,77.58]	87.63**	[21.42,153.83]	45.29	[-44.61,135.19]
Other	-3306.85	[-8796.32,2182.62]	-680.43	[-4845.77,3484.91]	-4136.43	[-9543.92,1271.06]	-902.77	[-3048.50,1242.97]	-2732.56	[-6270.15,805.04]	264.49	[-148.46,677.43]	-73.55	[-426.42,279.31]	-127.55	[-633.52,378.42]
Plan Type (omitted = CMM)																
Smart Choice	-1909.25**	[-3166.61,-651.89]	-426.18	[-1626.75,774.39]	-537.40	[-2229.65,1154.86]	-961.00***	[-1526.58,-395.42]	-1227.80*	[-2331.58,-124.02]	-118.91*	[-233.21,-4.61]	-82.3	[-190.61,26.01]	8.03	[-125.89,141.96]
Smart Choice Basic	-2743.73***	[-4037.20,-1450.26]	-1546.21*	[-2795.91,-296.50]	-1812.78*	[-3571.30,-54.27]	-1123.43**	[-1709.71,-537.15]	-1642.51**	[-2786.96,-498.06]	-138.28*	[-256.71,-19.85]	-54.99	[-166.79,56.82]	73.06	[-66.57,212.68]
Smart Choice Plus	1518.64	[-126.65,3163.94]	3978.25***	[2420.96,5535.55]	2305.37*	[165.97,4444.77]	510.15	[-228.44,1248.75]	148.9	[-1243.31,1541.10]	47.99	[-99.79,195.76]	107.43	[-29.52,244.37]	61.22	[-114.16,236.60]
Practice and county-level controls																
# Primary Care Providers	-51.79	[-148.20,44.62]	37.93	[-26.08,101.94]	37.26*	[2.70,71.82]	5.89	[-19.06,30.84]	14.37	[-5.12,33.87]	0.28	[-8.88,9.45]	1.28	[-2.84,5.41]	2.91*	[0.00,5.83]
Multisite Practice	—	—	-1409.33	[-4164.31,1345.64]	-3823.63	[-10421.90,2774.63]	-400.06	[-1838.96,1038.84]	-2238.17	[-6274.39,1798.05]	-198.23	[-555.16,158.70]	- 90.93	[-308.75,126.89]	—	—
Rural-Urban																
Non-urban, Non-rural	-22.79	[-948.67,903.10]	601.07	[-289.45,1491.59]	-250.04	[-1500.58,1000.50]	253.42	[-92.55,599.38]	172.7	[-495.25,840.66]	101.98**	[33.66,170.30]	-7.01	[-76.34,62.32]	-11.19	[-116.08,93.70]
Rural	-1036.28	[-3482.39,1409.84]	-1412	[-3735.21,911.21]	33.28	[-3350.40,3416.96]	-285.8	[-1248.81,677.22]	208.22	[-1652.42,2068.86]	38.17	[-110.49,186.83]	56.45	[-162.09,274.99]	-207.78	[-538.17,122.60]
Community-based Practice	187.59	[-1730.46,2105.65]	170.70	[-1090.13,1431.53]	-792.14	[-2239.82,655.55]	62	[-473.01,597.01]	-364.62	[-1141.45,412.21]	112.81	[-24.82,250.45]	84.98	[-5.08,175.05]	9.02	[-122.01,140.04]
County Proportion Poverty	-1863.41	[-12980.21,9253.40]	-8640.44	[-18630.01,1349.12]	-6175.74	[-20524.37,8172.90]	-76.9	[-4198.56,4044.76]	-1010.52	[-8887.45,6866.41]	-957.68*	[-1799.61,-115.75	-100.07	[-920.48,720.34]	-1577.96**	[-2753.58,-402.34
Primary Care Providers/10,000 Populatic	-36.05	[-117.94,45.83]	-3.78	[-60.38,52.83]	-57.92	[-160.01,44.17]	5.12	[-21.06,31.30]	- 10.53	[-60.97,39.91]	3.51	[-3.18,10.20]	-5.73	[-11.47,0.01]	-2.96	[-9.17,3.25]
County Proportion Race/Ethnicity																
Non-white, not Hispanic	-260.57	[-3054.42,2533.27]	-766.88	[-3577.87,2044.11]	815.89	[-3552.91,5184.69]	-139.58	[-1198.32,919.16]	440.9	[-2055.00,2936.79]	167.09	[-37.95,372.13]	120.31	[-96.06,336.68]	410.06*	[44.32,775.79]
Hispanic	-1416.1	[-7645.57,4813.37]	-2168.83	[-7915.62,3577.95]	1666.04	[-7078.36,10410.44]	59.67	[-2237.61,2356.95]	-776.46	[-5525.49,3972.57]	369.91	[-89.30,829.12]	75.73	[-357.73,509.19]	41.69	[-709.71,793.08]
Year																
2005	3657.84***	[2624.58,4691.10]	2201.04***	[1183.55,3218.52]	-1478.55	[-2966.14,9.04]	1426.94***	[961.75,1892.13]	-1899.85***	[-2847.89,-951.81]	298.33***	[207.20,389.47]	205.64***	[118.86,292.43]	-30.25	[-155.34,94.84]
2006	3617.71***	[2573.89,4661.54]	2527.09***	[1515.87,3538.31]	-1598.33*	[-3069.66,-127.00]	1391.27***	[927.86,1854.68]	-1971.55***	[-2911.37,-1031.73]	312.28***	[220.87,403.69]	181.49***	[95.45,267.53]	-6.55	[-130.06,116.96]
2007	3837.73***	[2799.16,4876.30]	2407.52***	[1401.15,3413.89]	-1098.30	[-2595.45,398.85]	1364.21***	[902.90,1825.52]	-1928.97***	[-2872.64,-985.30]	304.32***	[212.69,395.96]	203.02***	[116.94,289.09]	10.31	[-112.94,133.56]
2008	3948.66***	[2901.09,4996.23]	2828.00***	[1818.28,3837.71]	-812.53	[-2289.80,664.75]	1515.25***	[1055.78,1974.72]	-1951.16***	[-2896.42,-1005.90]	339.41***	[247.64,431.17]	253.79***	[168.30,339.28]	62.15	[-61.07,185.37]
Constant	6472.01	[-580.65,13524.66]	128.52	[-6529.37,6786.42]	1955.98	[-6846.90,10758.86]	1119.08	[-1941.41,4179.57]	3734.44	[-2016.37,9485.26]	-66.87	[-680.09,546.35]	-120.42	[-672.14,431.30]	193.93	[-575.55,963.40]
Average practice intercept	7.45***	[7.21,7.69]	6.91***	[6.55,7.28]	7.37***	[7.08,7.67]	6.07***	[5.55,6.58]	6.18***	[5.49,6.86]	4.44***	[3.99,4.88]	4.07***	[3.49,4.66]	4.89***	[4.56,5.22]
N	12383		16667		15917		27694		17273		11254		17772		15941	

Notes : Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.21a: Continued

	OP						RX					
	Low (<1572)		Medium (1572-3119)		High (>3119)		Low (<958)		Medium (958-1432)		High (>1432)	
	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95%	Coeff.	95% CI
CCNC	97.64	[-547.93,743.21]	-101.73	[-787.57,584.10]	85.18	[-778.57,948.94]	-162.09	[-343.08,18.89]	-169.53	[-365.08,26.01]	181.29	[-73.25,435.84]
	(AME = 97.64)		(AME = -101.73)		(AME = 85.18)		(AME = -162.09)		(AME = -169.53)		(AME = 181.29)	
Ever CCNC	-150.09	[-838.91,538.73]	88.33	[-626.01,802.66]	-112.04	[-1067.68,843.60]	108.93	[-115.57,333.43]	-17.85	[-265.39,229.70]	-240.30	[-518.90,38.30]
CCNC Early Adopter	486.19	[-81.76,1054.13]	-311.80	[-826.99,203.40]	890.45*	[90.61,1690.28]	-170.77	[-360.62,19.08]	-211.56	[-439.75,16.63]	-29.00	[-290.57,232.56]
Person-level controls												
Age	-77.96	[-255.80,99.88]	-90.63	[-253.14,71.87]	-127.55	[-331.93,76.82]	20.08	[-22.76,62.91]	114.89***	[68.26,161.52]	200.50***	[139.46,261.54]
Age^2	1.00	[-0.91,2.90]	1.24	[-0.50,2.98]	1.67	[-0.52,3.86]	-0.21	[-0.67,0.25]	-1.11***	[-1.60,-0.61]	-2.16***	[-2.82,-1.51]
Male	-860.22***	[-1178.19,-542.24]	-410.73**	[-713.03,-108.44]	-436.77*	[-834.86,-38.68]	45.43	[-33.92,124.78]	46.69	[-38.25,131.62]	267.89***	[149.15,386.62]
Charlson Index	754.52***	[443.53,1065.51]	2725.78***	[2469.06,2982.51]	1383.06***	[1035.05,1731.06]	564.00***	[487.17,640.82]	673.80***	[598.85,748.76]	910.64***	[810.75,1010.54]
Charlson Index^2	413.67***	[370.15,457.20]	155.94***	[124.35,187.52]	522.58***	[477.43,567.74]	0.20	[-10.69,11.09]	-4.90	[-14.96,5.16]	-27.54***	[-39.51,-15.58]
Eligibility (omitted = subscriber)												
Spouse	1456.14***	[961.22,1951.06]	440.49	[-29.71,910.69]	492.16	[-101.81,1086.13]	498.42***	[374.95,621.89]	693.90***	[562.55,825.25]	1228.44***	[1051.33,1405.55]
Other	-1467.63	[-5007.33,2072.07]	-944.44	[-3675.90,1787.02]	-2681.54	[-5570.93,207.85]	-76.17	[-761.92,609.58]	456.75	[-356.72,1270.22]	2388.12***	[1466.21,3310.02]
Plan Type (omitted = CMM)												
Smart Choice	-548.80	[-1334.41,236.81]	257.65	[-476.87,992.18]	516.21	[-447.27,1479.69]	-54.67	[-235.72,126.37]	186.08	[-31.19,403.36]	218.72	[-73.01,510.46]
Smart Choice Basic	-1057.13*	[-1864.42,-249.85]	-543.55	[-1306.62,219.51]	58.71	[-945.52,1062.93]	-287.13**	[-473.86,-100.41]	-79.68	[-304.60,145.23]	-15.04	[-318.75,288.68]
Smart Choice Plus	1730.91**	[696.65,2765.18]	738.79	[-197.46,1675.04]	2899.84***	[1666.22,4133.46]	302.53*	[58.32,546.75]	882.18***	[604.02,1160.33]	383.35*	[19.58,747.12]
Practice and county-level controls												
# Primary Care Providers	-31.56	[-84.93,21.81]	28.67	[-2.12,59.46]	19.14	[-1.18,39.47]	-3.87	[-15.59,7.85]	2.67	[-10.31,15.65]	10.17**	[3.00,17.34]
Multisite Practice	—	—	-1173.09	[-3411.82,1065.63]	-1418.46	[-3820.72,983.80]	-9.75	[-979.52,960.01]	340.69	[-658.21,1339.59]	-524.25	[-1611.46,562.97]
Rural-Urban												
Non-urban, Non-rural	28.57	[-495.59,552.73]	-255.37	[-759.14,248.40]	117.53	[-677.19,912.25]	72.30	[-98.82,243.42]	-125.04	[-337.77,87.69]	-167.75	[-423.67,88.17]
Rural	-928.62	[-2200.83,343.59]	-369.97	[-1792.50,1052.56]	703.41	[-1504.17,2910.98]	48.00	[-352.79,448.79]	-322.49	[-821.44,176.45]	274.53	[-627.63,1176.69]
Community-based Practice	101.94	[-933.46,1137.34]	-39.99	[-808.25,728.27]	-163.89	[-1002.36,674.58]	78.54	[-223.58,380.65]	35.91	[-243.67,315.49]	-405.64*	[-790.96,-20.31]
County Proportion Poverty	-6671.62	[-13427.08,83.85]	1812.69	[-4030.26,7655.64]	-9134.16*	[-17532.55,-735.76]	-1030.41	[-2954.32,893.50]	484.30	[-1930.83,2899.43]	228.57	[-2648.92,3106.06]
Primary Care Providers/10,000 Populatio	-39.51	[-86.59,7.58]	-26.88	[-64.61,10.86]	-15.31	[-69.60,38.97]	-2.56	[-16.89,11.77]	-2.84	[-19.08,13.40]	-16.28	[-34.16,1.59]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	219.26	[-1488.47,1926.98]	-452.83	[-1998.20,1092.55]	1937.90	[-608.20,4484.00]	-173.91	[-712.86,365.03]	-693.95*	[-1349.26,-38.65]	-952.68*	[-1729.80,-175.57]
Hispanic	-1523.09	[-4984.48,1938.30]	206.10	[-3231.36,3643.56]	2203.02	[-3281.31,7687.35]	-207.06	[-1412.31,998.19]	-998.62	[-2321.67,324.43]	-233.81	[-1923.74,1456.12]
Year												
2005	1885.13***	[1248.66,2521.60]	1348.82***	[716.21,1981.43]	-1650.05***	[-2497.04,-803.06]	799.96***	[633.15,966.76]	449.38***	[264.51,634.25]	91.84	[-155.99,339.66]
2006	1923.57***	[1288.91,2558.24]	1229.74***	[594.41,1865.08]	-1566.19***	[-2404.18,-728.21]	863.42***	[697.18,1029.65]	641.45***	[455.18,827.73]	213.33	[-33.54,460.19]
2007	1862.94***	[1236.49,2489.39]	1378.15***	[740.84,2015.45]	-1699.31***	[-2551.08,-847.53]	1089.47***	[922.32,1256.62]	851.88***	[665.76,1038.00]	334.32**	[84.21,584.42]
2008	1934.82***	[1301.34,2568.29]	1327.53***	[689.40,1965.67]	-1173.75**	[-2013.59,-333.90]	1016.24***	[848.22,1184.26]	783.85***	[597.85,969.85]	355.41**	[107.42,603.40]
Constant	3030.49	[-1383.16,7444.14]	67.64	[-3962.05,4097.34]	4361.43	[-666.09,9388.95]	-141.94	[-1232.60,948.71]	-2231.38**	[-3414.24,-1048.53	-3051.67***	[-4601.17,-1502.18]
Average practice intercept	6.79***	[6.53,7.05]	6.35***	[5.99,6.71]	6.85***	[6.56,7.14]	5.95***	[5.79,6.11]	6.04***	[5.86,6.22]	5.89***	[5.62,6.17]
N	12743		16541		15683		13507		15923		15537	

Notes: Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.21b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models, by Baseline Values

	Total			IP		ED			OP			Rx		
	Low	Medium	High	Low	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
CCNC														
MLM AME	- 641.22	518.31	- 16.92	- 163.5	- 114.24	2.00	44.94	- 22.53	97.64	- 101.73	85.18	- 162.09	- 169.53	181.29
	[-1728.74,446.30]	[-658.68,1695.30]	[-1453.20,1419.36]	[-673.34,346.34]	[-984.74,756.26]	[-93.75,97.75]	[-45.78,135.66]	[-147.73,102.67]	[-552.06,747.34]	[-791.95,588.49]	[-784.11,954.47]	[-344.23,20.05]	[-366.33,27.27]	[-74.88,437.46]
FE AME	- 560.33	258.43	1002.99	- 316.92	424.63	50.38	56.35	64.08	64.03	158.00	460.61	- 114.44	222.37	851.59
	[-2365.40,1244.73]	[-879.27,1396.12]	[-422.87,2428.85]	[-1147.10,513.27]	[-603.06,1452.32]	[-44.19,144.95]	[-18.07,130.77]	[-32.51,160.68]	[-379.11,507.16]	[-425.35,741.34]	[-514.13,1435.34]	[-235.42,6.55]	[-74.82,519.57]	[-1247.07,2950.25]

Notes: Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.22a: Multi-Level Estimates of the Moderating Effect of CCNC Patient Load on SHP Paid Medical Expenditures, by Baseline Values

	Total						IP				ED					
	Low (<2318)		Medium (2318-4877)		High (>4877)		Low (<1519)		High (>=1519)		Low (<5)		Medium (5-151)		High (>151)	
	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI
CCNC Patients (omitted = Very Low)																
Low	-869.82	[-2416.49,676.86]	-1899.44	[-3904.08,105.20]	-835.96	[-2891.02,1219.10]	-58.82	[-700.82,583.19]	-436.54	[-1785.54,912.46]	73.58	[-40.50,187.65]	119.77	[-14.92,254.46]	48.60	[-138.98,236.18]
	(AME = -869.82)		(AME = -1899.44)		(AME = -835.96)		(AME = -58.82)		(AME = -436.54)		(AME = 72.39)		(AME = 119.77)		(AME = 34.52)	
Medium	-1410.24	[-2907.49,87.01]	-1588.27	[-3660.86,484.33]	-337.92	[-2563.98,1888.14]	62.97	[-573.36,699.30]	660.78	[-762.18,2083.74]	61.36	[-49.06,171.77]	-35.42	[-185.10,114.26]	109.97	[-84.58,304.51]
	(AME = -1410.24)		(AME = -1588.27)		(AME = -337.92)		(AME = 62.97)		(AME = 660.78)		(AME = 62.39)		(AME = -36.12)		(AME = 121.52)	
High	-1217.78	[-2843.53,407.98]	-2218.79*	[-4436.87,-0.70]	1395.05	[-893.40,3683.50]	-44.65	[-721.43,632.14]	1848.56*	[341.14,3355.99]	142.23*	[13.36,271.10]	-5.41	[-147.96,137.14]	41.92	[-156.37,240.21]
	(AME = -1217.78)		(AME = -2218.79)		(AME = 1395.05)		(AME = -44.65)		(AME = 1848.57)		(AME = 148.55)		(AME = -4.25)		(AME = 52.92)	
Very High	-1786.83*	[-3395.05,-178.60]	-2475.66*	[-4618.89,-332.43]	-543.22	[-2625.01,1538.57]	79.02	[-581.13,739.17]	-71.67	[-1353.48,1210.14]	115.49	[-5.43,236.40]	24.68	[-111.57,160.93]	25.71	[-155.03,206.44]
	(AME = -1786.83)		(AME = -2475.66)		(AME = -543.22)		(AME = 79.02)		(AME = -71.67)		(AME = 111.70)		(AME = 25.23)		(AME = 13.40)	
CCNC Early Adopter	144.95	[-662.91,952.82]	340.47	[-896.45,1577.39]	1363.22	[-4.99,2731.43]	205.98	[-147.80,559.76]	224.51	[-519.50,968.53]	32.50	[-31.07,96.06]	-2.71	[-80.27,74.86]	120.30*	[20.01,220.59]
Person-level controls																
Age	-382.87*	[-739.10,-26.65]	39.62	[-448.16,527.41]	37.40	[-416.75,491.55]	-176.95*	[-352.23,-1.67]	-33.77	[-341.02,273.48]	-3.81	[-36.70,29.08]	-4.73	[-37.73,28.27]	12.76	[-33.43,58.95]
Age^2	4.56*	[0.73,8.39]	-0.71	[-5.93,4.51]	-0.45	[-5.32,4.43]	1.92*	[0.04,3.80]	0.27	[-3.03,3.58]	-0.06	[-0.42,0.29]	-0.01	[-0.36,0.35]	0.23	[-0.72,0.27]
Male	-1074.53**	[-1722.01,-427.06]	-879.33	[-1800.67,42.01]	495.59	[-399.51,1390.68]	2.31	[-319.28,323.91]	628.89*	[20.26,1237.52]	-74.38*	[-133.49,-15.28]	-57.27	[-122.52,7.98]	-103.04*	[-190.93,-15.15]
Charlson Index	4047.03***	[3420.37,4673.69]	5554.29***	[4812.17,6296.42]	6552.15***	[5827.10,7277.20]	1957.70***	[1652.54,2262.86]	2211.28***	[1737.93,2684.62]	198.75***	[142.47,255.03]	283.15***	[228.21,338.09]	420.77***	[350.61,490.92]
Charlson Index^2	441.40***	[352.38,530.43]	408.76***	[313.02,504.51]	369.19***	[282.06,456.33]	117.16***	[73.60,160.71]	198.36***	[143.56,253.17]	2.89	[-5.25,11.02]	-8.06*	[-15.15,-0.97]	-19.51***	[-27.80,-11.22]
Eligibility (omitted = subscriber)																
Spouse	3201.27***	[2132.34,4270.20]	4254.30***	[2857.44,5651.16]	2040.23**	[673.56,3406.89]	1015.68***	[502.49,1528.86]	527.14	[-397.00,1451.29]	38.88	[-53.78,131.55]	46.93	[-53.54,147.39]	1.73	[-136.56,140.01]
Other	-562.40	[-6820.65,5695.85]	-3240.35	[-10658.07,4177.36]	-5402.20	[-12532.87,1728.47]	-896.60	[-3721.49,1928.28]	-2953.87	[-7864.25,1956.52]	-21.98	[-560.87,516.92]	75.65	[-516.20,667.49]	33.73	[-640.46,707.93]
Plan Type (omitted = CMM)																
Smart Choice	-2808.54**	[-4607.44,-1009.64]	-1128.31	[-3613.98,1357.37]	937.78	[-1374.39,3249.95]	-2068.65***	[-2953.63,-1183.66]	-663.95	[-2241.07,913.17]	-105.54	[-272.40,61.32]	-79.15	[-256.66,98.36]	-60.14	[-282.26,161.98]
Smart Choice Basic	-3881.24***	[-5714.23,-2048.24]	-2551.18*	[-5095.51,-6.84]	-231.34	[-2614.58,2151.90]	-2414.71***	[-3319.34,-1510.08]	-972.88	[-2594.97,649.21]	-97.66	[-268.21,72.88]	-16.95	[-198.42,164.53]	-0.92	[-229.85,228.02]
Smart Choice Plus	-148.37	[-2398.11,2101.37]	7671.11***	[4549.94,10792.27]	3442.48*	[572.04,6312.93]	-50.00	[-1165.91,1065.91]	787.88	[-1154.28,2730.05]	82.23	[-124.91,289.37]	233.03*	[15.24,450.83]	113.56	[-170.25,397.37]
Practice and county-level controls																
# Primary Care Providers	-29.99	[-136.32,76.34]	-2.21	[-139.91,135.50]	53.92*	[11.78,96.06]	-12.52	[-48.18,23.14]	27.49*	[3.52,51.46]	3.17	[-5.86,12.20]	-4.38	[-11.19,2.42]	1.39	[-1.57,4.34]
Multisite Practice	—	—	-1425.54	[-5332.72,2481.65]	-2601.52	[-10761.23,5558.19]	16.93	[-1588.17,1622.03]	-1291.92	[-6418.49,3834.65]	-171.98	[-602.94,258.97]	-162.23	[-415.37,90.91]	—	—
Rural-Urban																
Non-urban, Non-rural	-252.62	[-1186.20,680.96]	-57.80	[-1556.35,1440.75]	-175.00	[-1735.42,1385.42]	176.92	[-240.64,594.48]	548.07	[-237.55,1333.69]	32.51	[-43.34,108.36]	-360.88	[-127.69,53.94]	-5.80	[-113.85,102.25]
Rural	-359.61	[-2239.11,1519.89]	-510.42	[-3451.53,2430.70]	-721.77	[-3972.71,2529.18]	-168.68	[-1033.25,695.90]	-258.16	[-2108.48,1592.17]	-10.80	[-137.04,115.45]	46.24	[-195.85,288.33]	-222.40	[-559.59,114.78]
Community-based Practice	707.17	[-1442.90,2857.23]	785.92	[-1353.67,2925.51]	-1010.14	[-3037.12,1016.84]	302.86	[-406.21,1011.93]	-111.90	[-1143.37,919.58]	171.12	[-10.08,352.32]	143.83*	[16.54,271.11]	-15.43	[-148.85,117.99]
County Proportion Poverty	-6284.59	[-17887.84,5318.66]	-4370.45	[-21778.53,13037.63]	-8192.97	[-27141.12,10755.18]	-2491.29	[-7519.88,2537.29]	- 2764.18	[-12949.61,7421.25]	-653.77	[-1611.03,303.49]	-208.85	[-1299.75,882.06]	-2435.63**	[-3986.11,-885.15]
Primary Care Providers/10,000 Population	-53.14	[-149.50,43.23]	-4.20	[-124.55,116.14]	-67.18	[-207.56,73.20]	-4.08	[-42.97,34.81]	2.64	[-69.35,74.64]	3.17	[-4.58,10.93]	-5.36	[-15.15,4.43]	-2.09	[-10.79,6.61]
County Proportion Race/Ethnicity																
Non-white, not Hispanic	354.65	[-2668.79,3378.08]	-1591.33	[-6317.38,3134.72]	950.52	[-4547.18,6448.22]	-25.80	[-1340.74,1289.15]	-118.19	[-3191.73,2955.35]	290.39*	[53.35,527.43]	339.85*	[28.20,651.50]	416.69	[-19.25,852.63]
Hispanic	-2263.54	[-7953.26,3426.17]	-2374.53	[-11235.43,6486.37]	2871.30	[-7935.75,13678.35]	-893.41	[-3399.75,1612.92]	-1808.23	[-7519.72,3903.26]	416.35*	[7.73,824.98]	549.09	[-38.20,1136.38]	-355.78	[-1265.59,554.03]
Year																
2005	3431.95*	[160.05,6703.86]	3276.41	[-80.28,6633.09]	-763.92	[-3879.04,2351.19]	1550.68*	[200.05,2901.31]	-278.71	[-2376.95,1819.54]	327.55	[-27.48,682.59]	90.34	[-113.85,294.52]	91.26	[-250.96,433.47]
2006	3513.59*	[265.11,6762.06]	4087.52*	[786.83,7388.21]	-1375.58	[-4450.27,1699.12]	1744.67*	[409.28,3080.06]	-688.08	[-2760.66,1384.49]	333.57	[-19.24,686.39]	126.27	[-74.31,326.85]	87.73	[-251.68,427.14]
2007	3824.65*	[591.70,7057.60]	3727.34*	[445.00,7009.69]	-633.72	[-3697.02,2429.58]	1823.06**	[493.99,3152.13]	-662.26	[-2729.33,1404.81]	346.93	[-4.64,698.50]	165.98	[-32.79,364.74]	98.68	[-239.76,437.13]
2008	4469.26**	[1226.76,7711.76]	3953.15*	[674.84,7231.46]	-511.73	[-3559.03,2535.56]	2039.48**	[709.10,3369.87]	- 890.97	[-2946.08,1164.14]	394.15*	[42.45,745.85]	217.27*	[20.05,414.49]	180.96	[-156.97,518.90]
Constant	9879.45*	[338.19,19420.70]	-582.01	[-12863.81,11699.79]	-950.24	[-12465.58,10565.09]	3136.95	[-1312.66,7586.56]	717.21	[-6967.91,8402.32]	-208.40	[-1096.80,680.01]	-112.02	[-940.40,716.36]	-7.34	[-1162.58,1147.90]
Average practice intercept	7.15***	[6.70,7.60]	7.24***	[6.74,7.73]	7.41***	[7.04,7.78]	6.01***	[5.22,6.80]	-5.13**	[-8.59,-1.67]	6.78***	[6.42,7.13]	6.74***	[6.21,7.28]	6.95***	[6.46,7.43]
N	7939		6937		10505		14616		10765		7847		8925		8609	

Notes: Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.22a: Continued

	OP						RX					
	Low (<1572)		Medium (1572-3119)		High (>3119)		Low (<958)		Medium (958-1432)		High (>1432)	
	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95% CI	Coeff.	95%	Coeff.	95% CI
CCNC Patients (omitted = Very Low)												
Low	-311.69	[-1330.71,707.33]	-2221.91***	[-3268.60,-1175.21]	-1020.81	[-2447.74,406.13]	94.10	[-174.80,362.99]	-12.12	[-299.75,275.50]	355.34	[-48.12,758.81]
	(AME = -311.69)		(AME = -2221.91)		(AME = -1020.81)		(AME = 94.10)		(AME = -12.12)		(AME = 355.34)	
Medium	-904.98	[-1880.13,70.18]	-2410.09***	[-3498.32,-1321.85]	-632.81	[-2230.85,965.23]	-66.56	[-350.43,217.32]	-190.96	[-492.75,110.83]	32.78	[-350.92,416.49]
	(AME = -904.98)		(AME = -2410.09)		(AME = -632.81)		(AME = -66.56)		(AME = -190.96)		(AME = 32.78)	
High	-930.55	[-2020.14,159.05]	-2276.06***	[-3445.59,-1106.54]	-501.58	[-2048.13,1044.96]	108.58	[-195.71,412.86]	-107.88	[-437.10,221.34]	95.41	[-291.46,482.28]
	(AME = -930.55)		(AME = -2276.06)		(AME = -501.58)		(AME = 108.58)		(AME = -107.88)		(AME = 95.41)	
Very High	-1207.66*	[-2263.97,-151.34]	-2505.49***	[-3624.52,-1386.45]	-1189.31	[-2660.90,282.28]	-207.28	[-504.63,90.07]	-257.78	[-571.73,56.17]	-88.40	[-477.23,300.43]
	(AME = -1207.66)		(AME = -2505.49)		(AME = -1189.31)		(AME = -207.28)		(AME = -257.78)		(AME = -88.40)	
CCNC Early Adopter	474.39	[-60.27,1009.06]	-294.83	[-944.04,354.37]	1326.78**	[344.58,2308.98]	-71.68	[-222.69,79.34]	-169.44	[-368.38,29.50]	-192.64	[-461.27,75.98]
Person-level controls												
Age	-137.47	[-380.22,105.28]	99.60	[-141.29,340.48]	-224.56	[-541.69,92.56]	16.64	[-35.19,68.46]	168.07***	[104.25,231.89]	130.09**	[48.41,211.77]
Age^2	1.61	[-0.99,4.21]	-1.11	[-3.70,1.47]	2.81	[-0.59,6.22]	-0.17	[-0.73,0.39]	-1.69***	[-2.37,-1.01]	-1.51***	[-2.39,-0.63]
Male	-1420.47***	[-1848.62,-992.31]	-161.58	[-633.11,309.96]	-252.14	[-877.98,373.71]	6.84	[-89.85,103.52]	-17.3	[-133.75,99.15]	147.65	[-16.15,311.44]
Charlson Index	1368.70***	[957.65,1779.74]	3477.12***	[3102.63,3851.61]	2128.97***	[1605.98,2651.96]	673.69***	[581.80,765.58]	646.48***	[550.75,742.22]	834.36***	[702.08,966.64]
Charlson Index^2	348.18***	[289.79,406.56]	75.32***	[30.84,119.80]	421.84***	[355.93,487.74]	-29.58***	[-42.81,-16.35]	-8.92	[-21.65,3.80]	-20.18**	[-35.48,-4.88]
Eligibility (omitted = subscriber)												
Spouse	2624.31***	[1919.55,3329.06]	258.68	[-474.68,992.04]	1026.14*	[90.15,1962.13]	681.33***	[525.57,837.09]	605.77***	[426.94,784.60]	1559.72***	[1309.81,1809.63]
Other	-1736.26	[-6238.09,2765.56]	-743.17	[-4763.73,3277.40]	-2908.54	[-7472.32,1655.24]	-262.94	[-1054.72,528.85]	343.37	[-780.28,1467.03]	870.52	[-419.74,2160.78]
Plan Type (omitted = CMM)												
Smart Choice	83.72	[-1065.37,1232.81]	1044.16	[-237.96,2326.27]	677.81	[-959.29,2314.91]	-46.97	[-293.40,199.46]	275.54	[-39.13,590.21]	201.77	[-251.28,654.82]
Smart Choice Basic	-537.01	[-1707.26,633.25]	-18.53	[-1334.16,1297.11]	239.33	[-1445.70,1924.36]	-313.13*	[-564.21,-62.04]	33.61	[-289.24,356.45]	110.53	[-355.30,576.36]
Smart Choice Plus	2292.63**	[843.07,3742.18]	1581.63	[-1.71,3164.97]	3389.18**	[1345.18,5433.19]	433.06**	[116.36,749.77]	1087.13***	[691.10,1483.15]	127.47	[-419.52,674.46]
Practice and county-level controls												
# Primary Care Providers	5.89	[-71.82,83.61]	31.99	[-18.75,82.74]	26.45	[-1.28,54.19]	3.37	[-8.91,15.66]	14.03	[-2.16,30.22]	16.22***	[7.63,24.81]
Multisite Practice	—	—	22.49	[-2980.63,3025.62]	-1629.40	[-4837.23,1578.42]	-101.89	[-1083.82,880.04]	20.93	[-909.64,951.50]	-580.43	[-1831.31,670.45]
Rural-Urban												
Non-urban, Non-rural	-346.85	[-962.71,269.01]	-951.24*	[-1703.28,-199.20]	551.58	[-644.44,1747.61]	-79.91	[-254.14,94.31]	144.32	[-91.61,380.25]	- 357.20*	[-660.60,-53.80]
Rural	-575.30	[-1775.61,625.01]	-1136.04	[-2763.92,491.84]	2510.41*	[317.77,4703.05]	127.90	[-180.46,436.27]	-260.95	[-702.99,181.10]	-340.44	[-1139.48,458.60]
Community-based Practice	657.82	[-528.48,1844.12]	-805.75	[-2187.85,576.35]	-340.30	[-1656.01,975.41]	166.72	[-151.61,485.06]	174.85	[-160.62,510.31]	-79.35	[-687.73,529.02]
County Proportion Poverty	- 6682.02	[-14755.42,1391.39]	2118.15	[-7036.71,11273.01]	- 13346.57*	[-26098.34,-594.80]	-914.74	[-2945.68,1116.21]	326.48	[-2484.47,3137.42]	-769.27	[-4464.58,2926.04]
Primary Care Providers/10,000 Population	-78.33*	[-149.29,-7.37]	-32.10	[-99.48,35.27]	-11.75	[-104.17,80.66]	-5.90	[-25.09,13.28]	-9.68	[-30.68,11.33]	-33.37*	[-59.22,-7.52]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	1030.73	[-1083.57,3145.02]	1534.34	[-838.52,3907.20]	1701.59	[-2029.84,5433.01]	-111.87	[-671.42,447.68]	-1024.71**	[-1788.62,-260.81]	-572.85	[-1587.67,441.96]
Hispanic	149.43	[-3542.41,3841.28]	-3011.82	[-7651.09,1627.44]	6293.74	[-1583.89,14171.37]	517.03	[-573.24,1607.31]	-853.98	[-2141.14,433.19]	-845.53	[-2887.94,1196.88]
Year												
2005	1932.62*	[192.30,3672.94]	2323.51*	[157.53,4489.49]	-1294.26	[-3367.24,778.72]	663.42***	[308.35,1018.50]	287.16	[-382.43,956.76]	104.44	[-451.69,660.57]
2006	1958.78*	[238.24,3679.32]	2117.76	[-25.70,4261.22]	-1483.21	[-3523.08,556.66]	769.95***	[420.46,1119.43]	414.12	[-252.26,1080.50]	263.24	[-284.83,811.31]
2007	1899.60*	[190.43,3608.78]	2288.53*	[153.61,4423.45]	-1592.45	[-3629.37,444.48]	959.48***	[611.67,1307.29]	653.60	[-11.12,1318.32]	292.91	[-254.38,840.19]
2008	2100.46*	[386.76,3814.17]	2438.17*	[308.29,4568.05]	-1120.84	[-3150.57,908.89]	893.88***	[546.19,1241.57]	595.17	[-70.10,1260.45]	348.86	[-194.56,892.29]
Constant	3241.51	[-2919.29,9402.30]	-2866.81	[-9227.01,3493.40]	5576.59	[-2471.15,13624.33]	-319.28	[-1652.71,1014.14]	-3433.41***	[-5154.94,-1711.88]	-1277.06	[-3447.43,893.30]
Average practice intercept	5.80***	[5.59,6.01]	5.88***	[5.62,6.14]	5.82***	[5.26,6.38]	330.22	[266.59,409.04]	357.68	[276.98,461.89]	336.65	[192.03,590.19]
N	8033		8549		8799		8778		7766		8837	

Notes : Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.22b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed-Effects Models, by Baseline Values

	Total			IP		ED			OP			Rx		
	Low	Medium	High	Low	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
CCNC Patients (omitted=Very Low)														
Low														
MLM AME	- 869.82	- 1899.44	- 835.96	- 58.82	- 436.54	72.39	119.77	34.52	- 311.69	- 2221.91**	- 1020.81	94.10	- 12.12	355.34
	[-2409.59,669.95]	[-3895.12,96.24]	[-2881.83,1209.91]	[-697.96,580.32]	[-1779.51,906.43]	[-43.71,188.50]	[3.67,235.88]	[-98.36,167.40]	[-1326.16,702.78]	[-3263.93,-1179.89]	[-2447.25,405.63]	[-173.59,361.79]	[-298.46,274.22]	[-46.32,757.00]
FE AME	971.81	1114.74	1707.31	965.25	182.05	- 167.05	46.91	- 34.31	- 1859.56*	- 412.90	1812.52*	341.49	124.32	231.13
	[-4895.39,6839.02]	[-1949.20,4178.68]	[-98.83,3513.46]	[-1069.92,3000.43]	[-941.60,1305.70]	[-388.26,54.16]	[-146.08,239.91]	[-200.11,131.50]	[-3648.79,-70.34]	[-1821.41,995.61]	[367.48,3257.55]	[-33.75,716.74]	[-164.26,412.90]	[-29.15,491.42]
Medium														
MLM AME	- 1410.24*	- 1588.27	- 337.92	62.97	660.78	62.39	- 36.12	121.52	- 904.98*	- 2410.09**	- 632.81	- 66.56	- 190.96	32.78
	[-2749.96,-70.52]	[-3442.81,266.27]	[-2329.78,1653.94]	[-506.41,632.35]	[-612.47,1934.03]	[-38.89,163.67]	[-137.40,65.16]	[-1.39,244.43]	[-1777.54,-32.42]	[-3383.83,-1436.35]	[-2062.72,797.10]	[-320.57,187.45]	[-461.00,79.08]	[-310.56,376.12]
FE AME	771.99	1168.00	1152.81	1300.01	1286.84	- 152.49	225.61	- 42.38	- 2118.74	- 1925.27	1275.89	383.39	182.45	- 134.87
	[-5375.59,6919.56]	[-3168.89,5504.89]	[-1316.68,3622.31]	[-919.77,3519.78]	[-594.63,3168.31]	[-419.84,114.86]	[-563.39,112.17]	[-266.22,181.47]	[-4255.28,17.79]	[-4156.84,306.30]	[-1116.46,3668.23]	[-44.32,811.09]	[-188.91,553.80]	[-552.29,282.54]
High														
MLM AME	- 1217.78	- 2218.79	1395.05	- 44.65	1848.57*	148.55	- 4.25	52.92	- 930.55	- 2276.06**	- 501.58	108.58	- 107.88	95.41
	[-3088.69,653.13]	[-4771.34, 333.76]	[-1238.48,4028.58]	[-823.49,734.19]	[113.84,3583.30]	[-3.35,300.45]	[-156.15,147.65]	[-132.58,238.42]	[-2184.45,323.35]	[-3621.94,-930.18]	[-2281.33,1278.17]	[-241.58,458.75]	[-486.74,270.98]	[-349.80,540.62]
FE AME	1611.60	- 2841.71	4478.81*	1456.42	592.63	- 61.73	- 81.28	- 179.81	- 1984.49	- 2306.15	2565.71	402.11	260.25	- 327.49
	[-4851.51,8074.70]	[-8469.02,2785.60]	[743.78,8213.84]	[-1064.96,3977.79]	[-4107.67,5292.93]	[-363.18,239.72]	[-444.19,281.63]	[-535.23,175.60]	[-4345.58,376.61]	[-4722.92,110.61]	[-521.00,5652.43]	[-50.15,854.37]	[-210.51,731.02]	[-967.31,312.34]
Very High														
MLM AME	- 1786.83*	- 2475.66*	- 543.22	79.02	- 71.67	111.70	25.23	13.40	- 1207.66*	- 2505.49**	- 1189.31	- 207.28	- 257.78	- 88.40
	[-3502.14,-71.52]	[-4761.60,-189.72]	[-2763.63,1677.19]	[-625.34,783.38]	[-1438.83,1295.49]	[-20.61,244.01]	[-107.08,157.54]	[-152.94,179.74]	[-2334.31,-81.01]	[-3699.04,-1311.94]	[-2758.89,380.27]	[-524.43,109.87]	[-592.64,77.08]	[-503.12,326.32]
FE AME	1623.37	- 645.62	4346.03*	2283.41	283.55	- 266.18	30.67	- 231.14	- 2076.29	- 1159.34	2822.67	172.08	50.55	- 447.16
	[-4957.46,8204.20]	[-7035.30,5744.07]	[36.64,8655.43]	[-268.87,4835.69]	[-4249.95,4817.05]	[-676.92,144.57]	[-354.43,415.77]	[-614.83,152.55]	[-4743.23,590.66]	[-3772.34,1453.66]	[-760.35,6405.70]	[-386.27,730.44]	[-408.95,510.06]	[-1126.41,232.09]

Notes: Bootstrapped OLS models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.23a: Multi-Level Odds Ratios of the Effect of CCNC on Receipt of Yearly Diabetes Measures, by Primary Care Visits

	A1C						LDL					
	Low (<3)		Medium (3-5)		High (>5)		Low (<3)		Medium (3-5)		High (>5)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC	1.19	[0.98,1.44]	1.25*	[1.03,1.51]	1.22	[0.99,1.50]	0.99	[0.83,1.18]	1.16	[1.00,1.36]	1.04	[0.87,1.25]
	(AME = 0.026)		(AME = 0.0241)		(AME = 0.023)		(AME = -0.003)		(AME = 0.0225)		(AME = 0.006)	
Ever CCNC	0.86	[0.69,1.08]	1.04	[0.79,1.37]	0.93	[0.71,1.22]	0.98	[0.80,1.19]	1.09	[0.86,1.39]	1.11	[0.87,1.41]
CCNC Early Adopter	1.00	[0.99,1.01]	1.00	[0.99,1.01]	1.00	[0.99,1.00]	1.00	[0.99,1.00]	0.99*	[0.98,1.00]	0.99*	[0.98,1.00]
Person-level controls												
Age	1.00	[0.96,1.04]	1.06**	[1.02,1.11]	1.07**	[1.02,1.13]	1.10***	[1.06,1.15]	1.12***	[1.08,1.16]	1.10***	[1.05,1.15]
Age^2	1.00	[1.00,1.00]	1.00*	[1.00,1.00]	1.00*	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	1.00**	[1.00,1.00]
Male	1.15***	[1.06,1.25]	1.32***	[1.22,1.43]	1.25***	[1.13,1.39]	1.15***	[1.07,1.24]	1.30***	[1.22,1.40]	1.17***	[1.07,1.27]
Charlson Index	7.47***	[6.77,8.25]	5.71***	[5.22,6.24]	2.09***	[1.94,2.26]	1.95***	[1.80,2.11]	1.51***	[1.41,1.62]	1.03	[0.97,1.09]
Charlson Index^2	0.78***	[0.77,0.80]	0.83***	[0.82,0.84]	0.93***	[0.93,0.94]	0.92***	[0.91,0.93]	0.94***	[0.93,0.95]	0.99*	[0.98,1.00]
Eligibility (omitted = subscriber)												
Spouse	0.83**	[0.73,0.94]	0.84**	[0.74,0.96]	0.86*	[0.75,1.00]	0.84**	[0.75,0.94]	0.90	[0.81,1.00]	0.85*	[0.75,0.96]
Other	1.45	[0.84,2.51]	1.71	[0.88,3.33]	0.89	[0.39,2.02]	1.46	[0.89,2.42]	1.34	[0.76,2.34]	0.94	[0.44,2.03]
Plan Type (omitted = CMM)												
Smart Choice	1.21	[0.99,1.47]	1.36**	[1.11,1.67]	1.18	[0.94,1.48]	1.21*	[1.01,1.44]	1.40***	[1.19,1.65]	1.17	[0.97,1.42]
Smart Choice Basic	1.16	[0.94,1.42]	1.28*	[1.04,1.58]	1.14	[0.90,1.44]	1.14	[0.95,1.37]	1.28**	[1.08,1.52]	1.16	[0.95,1.41]
Smart Choice Plus	1.12	[0.86,1.47]	1.39*	[1.07,1.81]	1.15	[0.87,1.52]	1.06	[0.84,1.35]	1.27*	[1.02,1.57]	1.44**	[1.13,1.84]
Practice and county-level controls												
# Primary Care Providers	0.78*	[0.61,0.99]	0.62***	[0.47,0.80]	0.65**	[0.50,0.86]	0.82	[0.66,1.02]	0.67***	[0.53,0.84]	0.73**	[0.58,0.93]
Multisite Practice	0.91	[0.30,2.79]	0.96	[0.26,3.49]	1.36	[0.40,4.59]	0.70	[0.26,1.84]	1.79	[0.54,5.96]	2.08	[0.67,6.50]
Rural-Urban												
Non-urban, Non-rural	0.80*	[0.65,0.98]	0.67***	[0.53,0.85]	0.58***	[0.46,0.73]	0.80*	[0.67,0.96]	0.73**	[0.60,0.90]	0.77*	[0.63,0.94]
Rural	0.58*	[0.37,0.90]	0.43**	[0.26,0.72]	0.48**	[0.29,0.80]	0.48***	[0.32,0.71]	0.40***	[0.25,0.62]	0.42***	[0.26,0.66]
Community-based Practice	1.26	[0.91,1.74]	1.41	[0.96,2.07]	1.22	[0.86,1.75]	1.25	[0.94,1.66]	1.26	[0.90,1.76]	1.34	[0.98,1.84]
County Proportion Poverty	0.42	[0.04,3.92]	0.91	[0.08,10.48]	1.09	[0.09,13.74]	0.05**	[0.01,0.34]	0.06*	[0.01,0.54]	0.03**	[0.00,0.33]
Primary Care Providers/10,000 Population	0.98*	[0.96,1.00]	0.97**	[0.95,0.99]	0.96***	[0.94,0.98]	0.97***	[0.95,0.98]	0.96***	[0.94,0.98]	0.96***	[0.95,0.98]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.68	[0.37,1.27]	0.69	[0.34,1.40]	0.94	[0.46,1.92]	0.90	[0.53,1.55]	0.78	[0.42,1.45]	1.26	[0.67,2.38]
Hispanic	1.06	[0.32,3.55]	3.57	[0.88,14.41]	4.69*	[1.15,19.14]	2.04	[0.70,5.96]	2.84	[0.84,9.67]	2.23	[0.64,7.74]
Year												
2005	1.06	[0.88,1.29]	0.87	[0.72,1.05]	0.92	[0.75,1.14]	1.77***	[1.50,2.09]	1.56***	[1.34,1.81]	1.54***	[1.29,1.83]
2006	0.95	[0.79,1.14]	0.86	[0.71,1.04]	0.90	[0.73,1.12]	1.83***	[1.55,2.16]	1.73***	[1.49,2.01]	1.60***	[1.34,1.91]
2007	1.15	[0.95,1.39]	0.88	[0.73,1.07]	0.88	[0.71,1.09]	2.05***	[1.74,2.42]	1.97***	[1.69,2.29]	1.83***	[1.53,2.19]
2008	1.19	[0.98,1.44]	0.83	[0.69,1.01]	0.85	[0.69,1.06]	2.28***	[1.93,2.69]	1.97***	[1.69,2.29]	1.88***	[1.57,2.24]
Constant	0.31*	[0.11,0.90]	0.17**	[0.06,0.50]	0.46	[0.13,1.70]	0.03***	[0.01,0.09]	0.06***	[0.02,0.15]	0.18**	[0.06,0.56]
Average practice intercept	1.16***	[1.08,1.24]	1.52***	[1.44,1.62]	1.36***	[1.26,1.45]	0.99	[0.92,1.06]	1.35***	[1.27,1.43]	1.23***	[1.15,1.31]
N	17973		27940		19305		17973		27940		19305	

Notes : A1c is hemoglobin A1c test, LDL is low-density lipoprotein test. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.23a: Continued

	Eye Exam						Attention for Nephropathy					
	Low (<3)		Medium (3-5)		High (>5)		Low (<3)		Medium (3-5)		High (>5)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC	1.09	[0.92,1.29]	1.03	[0.92,1.17]	1.07	[0.93,1.23]	1.00	[0.84,1.19]	1.15	[0.99,1.34]	1.07	[0.89,1.29]
	(AME = 0.017)		(AME = 0.007)		(AME = 0.016)		(AME = 0.000)		(AME = 0.0192)		(AME = 0.0080)	
Ever CCNC	0.83**	[0.74,0.94]	0.96	[0.87,1.06]	0.98	[0.87,1.10]	0.96	[0.83,1.11]	0.87	[0.75,1.01]	0.99	[0.82,1.18]
CCNC Early Adopter	1.00	[1.00,1.01]	1.00	[1.00,1.01]	1.00	[0.99,1.00]	1.00	[0.99,1.01]	1.00	[0.99,1.00]	1.00	[0.99,1.01]
Person-level controls												
Age	0.98	[0.94,1.01]	0.96**	[0.93,0.99]	0.96*	[0.93,1.00]	1.11***	[1.07,1.15]	1.10***	[1.06,1.13]	1.07**	[1.02,1.13]
Age^2	1.00*	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	1.00***	[1.00,1.00]	1.00*	[1.00,1.00]
Male	0.83***	[0.77,0.89]	0.84***	[0.80,0.89]	0.88***	[0.82,0.94]	1.10*	[1.02,1.18]	1.04	[0.97,1.12]	0.99	[0.90,1.09]
Charlson Index	1.94***	[1.80,2.09]	1.74***	[1.64,1.84]	1.44***	[1.36,1.51]	2.44***	[2.26,2.64]	1.85***	[1.73,1.99]	1.39***	[1.30,1.49]
Charlson Index^2	0.93***	[0.92,0.95]	0.95***	[0.94,0.95]	0.97***	[0.96,0.98]	0.92***	[0.91,0.93]	0.94***	[0.93,0.95]	0.98***	[0.97,0.98]
Eligibility (omitted = subscriber)												
Spouse	1.01	[0.91,1.12]	0.95	[0.88,1.04]	0.95	[0.86,1.05]	0.91	[0.81,1.02]	1.05	[0.94,1.17]	0.91	[0.79,1.04]
Other	0.83	[0.50,1.39]	0.97	[0.59,1.59]	1.18	[0.61,2.28]	0.94	[0.59,1.50]	1.34	[0.80,2.23]	1.52	[0.67,3.44]
Plan Type (omitted = CMM)												
Smart Choice	1.30**	[1.08,1.57]	1.38***	[1.20,1.60]	1.38***	[1.18,1.61]	1.23*	[1.03,1.47]	1.16	[0.97,1.37]	1.23*	[1.00,1.52]
Smart Choice Basic	0.94	[0.78,1.14]	1.08	[0.93,1.26]	1.10	[0.93,1.29]	1.13	[0.94,1.36]	1.13	[0.95,1.35]	1.15	[0.93,1.43]
Smart Choice Plus	1.32*	[1.04,1.68]	1.35**	[1.12,1.61]	1.29**	[1.06,1.56]	1.27	[0.99,1.63]	1.24	[0.99,1.55]	1.33*	[1.02,1.74]
Practice and county-level controls												
# Primary Care Providers	0.91	[0.77,1.07]	1.00	[0.88,1.13]	0.94	[0.81,1.08]	0.97	[0.81,1.17]	0.95	[0.80,1.12]	0.90	[0.73,1.10]
Multisite Practice	0.81	[0.47,1.40]	1.28	[0.83,1.99]	1.18	[0.74,1.87]	0.80	[0.42,1.52]	0.64	[0.34,1.21]	0.79	[0.38,1.63]
Rural-Urban												
Non-urban, Non-rural	0.93	[0.83,1.04]	0.97	[0.88,1.06]	0.95	[0.85,1.05]	0.85*	[0.75,0.97]	0.91	[0.80,1.04]	0.82*	[0.70,0.96]
Rural	0.90	[0.69,1.16]	0.78*	[0.63,0.97]	0.75*	[0.58,0.97]	0.96	[0.72,1.29]	0.90	[0.68,1.20]	0.89	[0.62,1.30]
Community-based Practice	1.03	[0.88,1.20]	0.98	[0.86,1.12]	1.01	[0.87,1.18]	0.94	[0.76,1.15]	1.00	[0.81,1.23]	1.33*	[1.05,1.68]
County Proportion Poverty	0.63	[0.18,2.24]	0.33*	[0.12,0.96]	0.54	[0.16,1.87]	0.10**	[0.02,0.45]	0.02***	[0.01,0.11]	0.09*	[0.01,0.62]
Primary Care Providers/10,000 Population	1.01	[1.00,1.02]	1.02***	[1.01,1.02]	1.02***	[1.01,1.03]	0.99*	[0.98,1.00]	0.99*	[0.98,1.00]	0.98**	[0.97,0.99]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.71*	[0.51,0.99]	0.73*	[0.55,0.97]	0.99	[0.70,1.38]	1.95**	[1.30,2.93]	2.83***	[1.89,4.23]	3.20***	[1.92,5.34]
Hispanic	0.36**	[0.18,0.72]	0.75	[0.43,1.30]	0.71	[0.38,1.35]	2.17	[0.97,4.88]	1.28	[0.58,2.80]	4.73**	[1.75,12.75]
Year												
2005	0.92	[0.78,1.08]	0.94	[0.84,1.07]	0.84*	[0.73,0.96]	1.59***	[1.35,1.87]	1.58***	[1.36,1.82]	1.33**	[1.10,1.60]
2006	1.07	[0.91,1.26]	0.98	[0.87,1.10]	0.87*	[0.76,1.00]	1.49***	[1.27,1.75]	1.54***	[1.34,1.78]	1.44***	[1.20,1.75]
2007	1.66***	[1.41,1.94]	1.47***	[1.30,1.65]	1.23**	[1.08,1.41]	1.61***	[1.37,1.89]	1.66***	[1.44,1.92]	1.45***	[1.20,1.75]
2008	1.87***	[1.59,2.19]	1.63***	[1.45,1.83]	1.37***	[1.20,1.57]	1.73***	[1.47,2.04]	1.53***	[1.33,1.77]	1.39***	[1.15,1.68]
Constant	0.22***	[0.09,0.54]	0.35**	[0.17,0.73]	0.40*	[0.16,0.99]	0.05***	[0.02,0.13]	0.16***	[0.07,0.37]	0.30*	[0.09,0.98]
Average practice intercept	0.28***	[0.22,0.35]	0.32***	[0.28,0.36]	0.38***	[0.33,0.43]	0.52***	[0.46,0.59]	0.60***	[0.54,0.66]	0.66***	[0.58,0.75]
N	17973		27940		19305		17973		27940		19305	

Notes: A1c is hemoglobin A1c test, LDL is low-density lipoprotein test. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.23b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models, by Primary Care Visits

	>=1 A1C			>=1 LDL			>=1 Eye Exam			Attention for Nephropathy		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
CCNC												
MLM AME	0.026	0.0241*	0.023	-0.003	0.0225	0.006	0.017	0.007	0.016	0.000	0.0192	0.008
	[-0.002,0.0546]	[0.0040,0.0442]	[-0.0010,0.0472]	[-0.036,0.030]	[-0.00022,0.04522]	[-0.020,0.032]	[-0.018,0.052]	[-0.020,0.034]	[-0.015,0.047]	[-0.029,0.029]	[-0.00060,0.03900]	[-0.014,0.030]
FE AME	0.027	0.0216	0.019	- 0.007	0.0272	0.013	- 0.007	0.003	0.016	0.011	0.0258	0.004
	[-0.012,0.066]	[-0.0058, 0.0491]	[-0.015,0.052]	[-0.047,0.034]	[-0.0034,0.0578]	[-0.025,0.051]	[-0.042,0.027]	[-0.028,0.034]	[-0.022,0.055]	[-0.028,0.050]	[-0.0003,0.0519]	[-0.026,0.033]

Notes: Logit models used for mult-level models. Cluster robust linear probability models used for fixed-effects models.

*p<0.05,**p<0.01,***p<0.001

Table 5.24a: Multi-Level Odds Ratios of the Moderating Effect of CCNC Patient Load on Receipt of Yearly Diabetes Measures, by Primary Care Visits

	A1C						LDL					
	Low (<3)		Medium (3-5)		High (>5)		Low (<3)		Medium (3-5)		High (>5)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC Patients (omitted = Very Low)												
Low	1.03	[0.73,1.46]	1.27	[0.87,1.85]	1.22	[0.81,1.83]	0.89	[0.66,1.20]	1.19	[0.87,1.62]	1.25	[0.87,1.79]
	(AME = 0.0047)		(AME = 0.0264)		(AME = 0.0248)		(AME = -0.0225)		(AME = 0.0252)		(AME = 0.0331)	
Medium	1.00	[0.69,1.45]	1.08	[0.72,1.62]	1.17	[0.77,1.79]	0.95	[0.69,1.31]	1.20	[0.85,1.70]	1.24	[0.84,1.83]
	(AME = -0.0003)		(AME = 0.0087)		(AME = 0.0202)		(AME = -0.0101)		(AME = 0.0267)		(AME = 0.0326)	
High	0.91	[0.61,1.36]	1.05	[0.68,1.63]	0.84	[0.53,1.32]	0.79	[0.56,1.11]	1.17	[0.81,1.70]	0.96	[0.64,1.45]
	(AME = -0.0145)		(AME = 0.0058)		(AME = -0.0235)		(AME = -0.0466)		(AME = 0.0230)		(AME = -0.0061)	
Very High	1.03	[0.70,1.54]	1.07	[0.69,1.66]	1.22	[0.78,1.91]	0.84	[0.59,1.18]	0.90	[0.62,1.31]	1.09	[0.73,1.63]
	(AME = 0.0049)		(AME = 0.0082)		(AME = 0.0246)		(AME = -0.0346)		(AME = -0.0158)		(AME = 0.0130)	
CCNC Early Adopter	0.87	[0.67,1.12]	1.00	[0.74,1.37]	0.90	[0.67,1.22]	0.96	[0.77,1.21]	1.16	[0.89,1.53]	1.16	[0.88,1.54]
Person-level controls												
Age	0.97	[0.92,1.03]	1.03	[0.97,1.09]	1.02	[0.94,1.09]	1.11***	[1.05,1.17]	1.08**	[1.02,1.13]	1.04	[0.97,1.11]
Age^2	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]	1.00**	[1.00,1.00]	1.00	[1.00,1.00]	1.00	[1.00,1.00]
Male	1.13*	[1.00,1.27]	1.40***	[1.25,1.57]	1.19*	[1.03,1.37]	1.06	[0.95,1.17]	1.27***	[1.15,1.41]	1.25***	[1.10,1.42]
Charlson Index	8.03***	[6.92,9.33]	6.28***	[5.51,7.16]	2.05***	[1.84,2.29]	2.05***	[1.82,2.31]	1.50***	[1.35,1.66]	1.04	[0.95,1.13]
Charlson Index^2	0.77***	[0.75,0.80]	0.81***	[0.80,0.83]	0.94***	[0.92,0.95]	0.91***	[0.89,0.93]	0.94***	[0.93,0.96]	0.99	[0.98,1.00]
Eligibility (omitted = subscriber)												
Spouse	0.81*	[0.67,0.97]	0.80*	[0.66,0.96]	0.81*	[0.66,0.99]	0.83*	[0.71,0.99]	0.92	[0.78,1.08]	0.76**	[0.63,0.91]
Other	0.78	[0.35,1.75]	1.12	[0.44,2.81]	0.48	[0.14,1.67]	1.24	[0.57,2.71]	0.48	[0.21,1.11]	0.61	[0.20,1.89]
Plan Type (omitted = CMM)												
Smart Choice	1.24	[0.89,1.72]	0.99	[0.70,1.39]	1.15	[0.81,1.63]	1.12	[0.83,1.51]	1.49**	[1.14,1.94]	1.38*	[1.03,1.86]
Smart Choice Basic	1.15	[0.82,1.61]	0.91	[0.65,1.29]	1.11	[0.77,1.59]	1.06	[0.78,1.43]	1.40*	[1.06,1.83]	1.43*	[1.05,1.94]
Smart Choice Plus	1.30	[0.84,2.00]	0.87	[0.58,1.32]	1.10	[0.72,1.67]	0.99	[0.67,1.46]	1.10	[0.79,1.52]	1.51*	[1.05,2.17]
Practice and county-level controls												
# Primary Care Providers	1.00	[0.99,1.01]	1.01	[0.99,1.02]	0.99	[0.99,1.00]	1.00	[0.99,1.01]	0.99	[0.98,1.00]	0.99**	[0.98,1.00]
Multisite Practice	0.94	[0.26,3.44]	1.26	[0.26,6.06]	1.69	[0.39,7.32]	0.76	[0.25,2.34]	1.21	[0.30,4.78]	2.02	[0.51,8.08]
Rural-Urban												
Non-urban, Non-rural	1.04	[0.77,1.41]	0.95	[0.67,1.36]	0.71	[0.50,1.01]	0.96	[0.74,1.25]	0.99	[0.72,1.35]	0.96	[0.70,1.32]
Rural	0.78	[0.44,1.39]	0.63	[0.32,1.22]	0.58	[0.30,1.13]	0.57*	[0.35,0.94]	0.44**	[0.25,0.79]	0.37**	[0.20,0.69]
Community-based Practice	0.74	[0.44,1.23]	0.87	[0.46,1.65]	0.71	[0.39,1.32]	0.9	[0.57,1.40]	1.01	[0.58,1.76]	1.18	[0.68,2.04]
County Proportion Poverty	0.92	[0.03,25.81]	0.95	[0.03,35.77]	1.43	[0.03,61.23]	0.04*	[0.00,0.76]	0.02*	[0.00,0.38]	0.02*	[0.00,0.47]
Primary Care Providers/10,000 Population	0.95**	[0.93,0.98]	0.92***	[0.89,0.96]	0.93***	[0.90,0.96]	0.93***	[0.91,0.96]	0.91***	[0.89,0.94]	0.93***	[0.90,0.95]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.47	[0.19,1.19]	0.68	[0.23,1.95]	0.86	[0.29,2.52]	0.68	[0.30,1.52]	0.78	[0.31,1.95]	1.14	[0.43,3.03]
Hispanic	0.56	[0.10,3.08]	1.03	[0.13,8.03]	1.09	[0.15,8.18]	1.56	[0.35,6.96]	2.41	[0.41,14.29]	1.98	[0.31,12.66]
Year												
2005	0.61	[0.35,1.06]	1.08	[0.65,1.82]	1.04	[0.58,1.87]	1.85**	[1.18,2.90]	1.71**	[1.18,2.49]	2.01**	[1.30,3.10]
2006	0.59	[0.34,1.02]	0.97	[0.58,1.62]	1.01	[0.56,1.81]	1.84**	[1.18,2.86]	1.74**	[1.20,2.52]	2.11***	[1.38,3.22]
2007	0.73	[0.42,1.25]	0.94	[0.56,1.56]	0.98	[0.55,1.75]	1.99**	[1.28,3.09]	2.09***	[1.44,3.03]	2.43***	[1.59,3.72]
2008	0.76	[0.44,1.31]	0.86	[0.52,1.44]	0.94	[0.52,1.67]	2.29***	[1.47,3.56]	1.89***	[1.31,2.74]	2.33***	[1.52,3.56]
Constant	1.80	[0.36,9.06]	0.70	[0.13,3.85]	2.99	[0.39,22.59]	0.06***	[0.01,0.25]	0.20*	[0.05,0.83]	0.60	[0.10,3.52]
Average practice intercept	1.27***	[1.15,1.40]	1.66***	[1.52,1.80]	1.43***	[1.30,1.58]	1.07	[0.97,1.19]	1.44***	[1.32,1.56]	1.35***	[1.22,1.49]
N	8307		13024		8902		8307		13024		8902	

Notes : A1c is hemoglobin A1c test, LDL is low-density lipoprotein test. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.24a: Continued

	Eye Exam						Attention for Nephropathy					
	Low (<3)		Medium (3-5)		High (>5)		Low (<3)		Medium (3-5)		High (>5)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CCNC Patients (omitted = Very Low)												
Low	0.83	[0.68,1.03]	0.99	[0.84,1.18]	1.11	[0.91,1.35]	0.77*	[0.60,0.98]	0.97	[0.77,1.22]	0.94	[0.69,1.27]
	(AME = -0.0381)		(AME = -0.0014)		(AME = 0.0237)		(AME = -0.0445)		(AME = -0.0046)		(AME = -0.0080)	
Medium	0.80*	[0.64,0.99]	1.00	[0.84,1.19]	1.02	[0.83,1.25]	0.81	[0.62,1.05]	1.07	[0.84,1.37]	1.18	[0.86,1.63]
	(AME = -0.0476)		(AME = -0.0004)		(AME = 0.0046)		(AME = -0.0346)		(AME = 0.0097)		(AME = 0.0191)	
High	0.83	[0.65,1.05]	1.03	[0.85,1.25]	1.06	[0.85,1.33]	0.87	[0.65,1.15]	1.13	[0.87,1.47]	0.98	[0.70,1.39]
	(AME = -0.0401)		(AME = 0.0070)		(AME = 0.0143)		(AME = 0-0.0231)		(AME = 0.0164)		(AME = -0.0019)	
Very High	0.79*	[0.63,0.98]	0.92	[0.77,1.10]	0.95	[0.77,1.16]	0.83	[0.63,1.08]	1.10	[0.85,1.41]	1.07	[0.78,1.49]
	(AME = -0.0497)		(AME = - 0.0190)		(AME = -0.0124)		(AME = -0.0313)		(AME = 0.0128)		(AME = 0.0085)	
CCNC Early Adopter	0.85*	[0.75,0.96]	0.97	[0.87,1.08]	0.97	[0.86,1.10]	0.98	[0.84,1.14]	0.91	[0.78,1.06]	0.95	[0.78,1.17]
Person-level controls												
Age	0.96	[0.91,1.01]	0.95*	[0.91,0.99]	0.98	[0.93,1.04]	1.11***	[1.06,1.17]	1.09***	[1.04,1.15]	1.06	[0.99,1.13]
Age^2	1.00*	[1.00,1.00]	1.00***	[1.00,1.00]	1.00	[1.00,1.00]	1.00***	[1.00,1.00]	1.00**	[1.00,1.00]	1.00	[1.00,1.00]
Male	0.78***	[0.71,0.87]	0.85***	[0.78,0.91]	0.89*	[0.81,0.98]	1.12*	[1.00,1.24]	1.09	[0.98,1.20]	1.05	[0.91,1.21]
Charlson Index	1.87***	[1.68,2.09]	1.76***	[1.62,1.91]	1.40***	[1.30,1.51]	2.56***	[2.28,2.87]	2.05***	[1.85,2.27]	1.39***	[1.27,1.53]
Charlson Index^2	0.94***	[0.92,0.96]	0.94***	[0.93,0.96]	0.97***	[0.96,0.98]	0.92***	[0.90,0.94]	0.93***	[0.92,0.94]	0.98***	[0.97,0.99]
Eligibility (omitted = subscriber)												
Spouse	1.06	[0.90,1.24]	0.91	[0.80,1.03]	0.91	[0.79,1.04]	0.93	[0.78,1.10]	1.05	[0.89,1.24]	0.84	[0.69,1.03]
Other	0.91	[0.44,1.87]	0.89	[0.45,1.79]	0.92	[0.34,2.50]	0.86	[0.44,1.70]	1.17	[0.59,2.34]	1.01	[0.31,3.26]
Plan Type (omitted = CMM)												
Smart Choice	1.70**	[1.23,2.35]	1.40**	[1.11,1.76]	1.25	[0.98,1.59]	1.55**	[1.16,2.07]	1.22	[0.94,1.60]	1.05	[0.75,1.47]
Smart Choice Basic	1.22	[0.87,1.70]	1.09	[0.86,1.37]	1.00	[0.78,1.28]	1.36*	[1.02,1.83]	1.16	[0.88,1.53]	0.96	[0.68,1.36]
Smart Choice Plus	1.64*	[1.11,2.44]	1.47**	[1.11,1.95]	1.15	[0.86,1.54]	1.28	[0.88,1.86]	1.19	[0.85,1.68]	1.22	[0.80,1.85]
Practice and county-level controls												
# Primary Care Providers	1.00	[1.00,1.01]	1.00	[1.00,1.01]	1.00	[0.99,1.01]	1.00	[0.99,1.01]	1.00	[0.99,1.00]	1.00	[0.99,1.01]
Multisite Practice	0.83	[0.46,1.51]	1.64*	[1.01,2.66]	1.09	[0.65,1.83]	0.98	[0.48,1.99]	0.69	[0.35,1.38]	1.15	[0.48,2.78]
Rural-Urban												
Non-urban, Non-rural	0.84*	[0.72,0.97]	0.86*	[0.76,0.98]	0.81**	[0.70,0.93]	0.83*	[0.69,0.99]	0.97	[0.81,1.17]	0.80	[0.63,1.02]
Rural	0.79	[0.58,1.07]	0.70**	[0.54,0.90]	0.71*	[0.52,0.96]	0.84	[0.60,1.19]	0.83	[0.59,1.16]	0.82	[0.51,1.31]
Community-based Practice	1.05	[0.84,1.31]	1.07	[0.88,1.31]	1.00	[0.80,1.25]	0.76	[0.57,1.02]	0.72*	[0.53,0.98]	1.01	[0.69,1.49]
County Proportion Poverty	3.59	[0.59,21.89]	1.82	[0.41,8.15]	1.43	[0.25,8.27]	0.62	[0.07,5.41]	0.03***	[0.00,0.22]	0.93	[0.05,15.75]
Primary Care Providers/10,000 Population	1.01	[0.99,1.02]	1.01*	[1.00,1.03]	1.02**	[1.01,1.03]	0.97***	[0.96,0.99]	0.97***	[0.96,0.99]	0.98*	[0.96,1.00]
County Proportion Race/Ethnicity												
Non-white, not Hispanic	0.59*	[0.37,0.96]	0.50***	[0.34,0.74]	0.79	[0.49,1.27]	1.25	[0.70,2.22]	2.03*	[1.16,3.56]	2.11	[0.99,4.52]
Hispanic	0.44	[0.18,1.09]	0.60	[0.29,1.26]	0.78	[0.33,1.83]	1.51	[0.52,4.33]	0.72	[0.25,2.03]	3.01	[0.75,12.10]
Year												
2005	0.97	[0.61,1.54]	0.98	[0.71,1.34]	1.07	[0.74,1.53]	1.96**	[1.28,2.98]	1.47*	[1.01,2.13]	1.64*	[1.03,2.60]
2006	1.13	[0.72,1.77]	0.99	[0.72,1.35]	1.01	[0.70,1.44]	2.00**	[1.32,3.04]	1.50*	[1.04,2.17]	1.80*	[1.14,2.85]
2007	1.67*	[1.06,2.62]	1.47*	[1.08,2.00]	1.41	[0.99,2.01]	2.28***	[1.50,3.45]	1.51*	[1.04,2.17]	1.67*	[1.06,2.63]
2008	1.83**	[1.17,2.87]	1.65**	[1.21,2.25]	1.52*	[1.07,2.17]	2.28***	[1.51,3.46]	1.38	[0.96,1.99]	1.65*	[1.05,2.60]
Constant	0.24*	[0.07,0.89]	0.36	[0.12,1.06]	0.24*	[0.06,0.93]	0.04***	[0.01,0.15]	0.28*	[0.08,0.97]	0.42	[0.07,2.51]
Average practice intercept	0.29***	[0.20,0.41]	0.31***	[0.26,0.38]	0.35***	[0.28,0.44]	0.50***	[0.42,0.60]	0.56***	[0.48,0.65]	0.68***	[0.57,0.82]
N	8307		13024		8902		8307		13024		8902	

Notes : A1c is hemoglobin A1c test, LDL is low-density lipoprotein test. Logit models used for all outcomes.

*p<0.05,**p<0.01,***p<0.001

Table 5.24b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed Effects Models, by Primary Care Visits

	>=1 A1C			>=1 LDL			>=1 Eye Exam			Attention for Nephropathy		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
CCNC Patients (omitted=Very Low)												
Low												
MLM AME	0.005	0.026	0.025	- 0.022	0.025	0.033	- 0.0381	- 0.001	0.024	- 0.0445*	- 0.005	- 0.008
	[-0.046,0.055]	[-0.014,0.067]	[-0.024,0.074]	[-0.077,0.032]	[-0.019,0.069]	[-0.019,0.085]	[-0.0797,0.0035]	[-0.037,0.035]	[-0.020,0.067]	[-0.0878,-0.0012]	[-0.038,0.029]	[-0.047,0.031]
FE AME	0.0196	0.0761	- 0.0269	0.0280	0.0180	0.0010	- 0.1316**	- 0.0235	0.0172	- 0.0918	- 0.0190	-0.0954**
	[-0.0842,0.1235]	[-0.0096,0.1619]	[-0.0745,0.0206]	[-0.1007,0.1567]	[-0.0803,0.1163]	[-0.0501,0.0521]	[-0.2303,-0.0330]	[-0.1286,0.0815]	[-0.0557,0.0902]	[-0.1952,0.0117]	[-0.0780,0.0399]	[-0.1554,-0.0354]
Medium												
MLM AME	- 0.000	0.009	0.020	- 0.010	0.027	0.033	- 0.0476	- 0.000	0.005	- 0.035	0.010	0.019
	[-0.064,0.063]	[-0.045,0.063]	[-0.040,0.081]	[-0.079,0.059]	[-0.030,0.083]	[-0.031,0.097]	[-0.0972,0.0019]	[-0.044,0.043]	[-0.047,0.057]	[-0.086,0.017]	[-0.029,0.048]	[-0.023,0.061]
FE AME	0.0381	0.0828	-0.0761*	0.0944	- 0.0017	- 0.0173	-0.1934*	-0.0436	0.0339	- 0.0693	0.0022	- 0.0909*
	[-0.1209,0.1970]	[-0.0211,0.1868]	[-0.1462,-0.0060]	[-0.0918,0.2807]	[-0.1166,0.1131]	[-0.0906,0.0561]	[-0.3754,-0.0114]	[-0.1636,0.0764]	[-0.052 0,0.1198]	[-0.2267,0.0880]	[-0.0789,0.0832]	[-0.1655,-0.0162]
High												
MLM AME	- 0.015	0.006	- 0.024	- 0.047	0.023	- 0.006	- 0.0401	0.007	0.014	- 0.023	0.016	- 0.002
	[-0.078,0.049]	[-0.046,0.058]	[-0.089,0.042]	[-0.114,0.022]	[-0.032,0.078]	[-0.072,0.060]	[-0.0891,0.0089]	[-0.036,0.050]	[-0.037,0.065]	[-0.072,0.025]	[-0.020,0.053]	[-0.046,0.042]
FE AME	- 0.2799	0.1001	- 0.1025*	- 0.0433	- 0.0253	- 0.0440	-0.4536***	-0.0184	0.0327	-0.0939	0.0036	- 0.1185**
	[-0.6262,0.0664]	[-0.0167,0.2168]	[-0.1870,-0.0180]	[-0.4609,0.3743]	[-0.1543,0.1037]	[-0.1350,0.0470]	[-0.6900,-0.2172]	[-0.1513,0.1144]	[-0.0612,0.1267]	[-0.2805,0.0926]	[-0.0975,0.1048]	[-0.2003,-0.0367]
Very High												
MLM AME	0.005	0.008	0.025	- 0.035	- 0.016	0.013	- 0.0497*	- 0.019	- 0.012	- 0.031	0.013	0.009
	[-0.055,0.065]	[-0.043,0.059]	[-0.031,0.080]	[-0.101,0.032]	[-0.074,0.042]	[-0.049,0.075]	[-0.0948,-0.0046]	[-0.058,0.020]	[-0.059,0.034]	[-0.077,0.015]	[-0.022,0.047]	[-0.031,0.048]
FE AME	-0.3416	0.1513*	-0.0775	0.0136	- 0.0225	- 0.0749	- 0.5312***	- 0.0247	0.0327	- 0.0434	-0.0106	- 0.1200**
	[-0.6925,0.0093]	[0.0094,0.2931]	[-0.1690,0.0140]	[-0.3781,0.4053]	[-0.1843,0.1393]	[-0.1839,0.0340]	[-0.7721,-0.2902]	[-0.1811,0.1316]	[-0.0659,0.1313]	[-0.2191,0.1323]	[-0.1190,0.0979]	[-0.2048,-0.0352]

Notes: Logit models used for mult-level models. Cluster robust linear probability models used for fixed-effects models.

*p<0.05,**p<0.01,***p<0.001

Table 5.25a: Multi-Level Estimates of the Effect of CCNC on Yearly Health Care Utilization, by Primary Care Visits

	Continuity of Care			
	Medium (3-5)		High (>5)	
	Coeff.	95% CI	Coeff.	95% CI
CCNC	0.0019	[-0.0188,0.0225]	-0.0142	[-0.0301,0.0017]
	(AME = 0.0025)		(AME = -0.0142)	
Ever CCNC	0.0212	[-0.0001,0.0424]	0.0300**	[0.0117,0.0483]
CCNC Early Adopter	0.0146	[-0.0009,0.0302]	0.0102	[-0.0057,0.0261]
Person-level controls				
Age	0.0150***	[0.0107,0.0193]	0.0108***	[0.0067,0.0148]
Age^2	-0.0002***	[-0.0002,-0.0001]	-0.0001***	[-0.0002,-0.0001]
Male	0.0980***	[0.0898,0.1062]	0.0586***	[0.0488,0.0684]
Charlson Index	-0.0830***	[-0.0900,-0.0760]	-0.0617***	[-0.0684,-0.0551]
Charlson Index^2	0.0051***	[0.0041,0.0060]	0.0036***	[0.0030,0.0043]
Eligibility (omitted = subscriber)				
Spouse	-0.0202**	[-0.0331,-0.0072]	-0.0251***	[-0.0371,-0.0130]
Other	0.0031	[-0.0715,0.0776]	-0.0312	[-0.1114,0.0490]
Plan Type (omitted = CMM)				
Smart Choice	-0.0144	[-0.0351,0.0062]	-0.0191	[-0.0400,0.0017]
Smart Choice Basic	0.0189	[-0.0029,0.0408]	0.0166	[-0.0048,0.0380]
Smart Choice Plus	-0.0524***	[-0.0786,-0.0261]	-0.0285*	[-0.0535,-0.0034]
Practice and county-level controls				
# Primary Care Providers	-0.0002	[-0.0009,0.0005]	0.0000	[-0.0004,0.0004]
Multisite Practice	-0.0240	[-0.1297,0.0817]	-0.0213	[-0.0955,0.0529]
Rural-Urban				
Non-urban, Non-rural	0.0137	[-0.0010,0.0285]	0.0048	[-0.0098,0.0195]
Rural	0.0499**	[0.0152,0.0846]	0.0484**	[0.0146,0.0822]
Community-based Practice	0.0388**	[0.0105,0.0670]	0.0222	[-0.0022,0.0465]
County Proportion Poverty	0.0321	[-0.1278,0.1921]	-0.0331	[-0.1930,0.1269]
Primary Care Providers/10,000 Population	0.0006	[-0.0008,0.0020]	0.0003	[-0.0008,0.0015]
County Proportion Race/Ethnicity				
Non-white, not Hispanic	0.0120	[-0.0326,0.0566]	-0.0343	[-0.0797,0.0110]
Hispanic	0.0506	[-0.0386,0.1398]	0.0407	[-0.0525,0.1339]
Year				
2005	-0.0329***	[-0.0508,-0.0149]	-0.0277***	[-0.0428,-0.0125]
2006	-0.0450***	[-0.0618,-0.0282]	-0.0331***	[-0.0489,-0.0173]
2007	-0.0673***	[-0.0848,-0.0498]	-0.0550***	[-0.0710,-0.0389]
2008	-0.0784***	[-0.0960,-0.0608]	-0.0634***	[-0.0800,-0.0468]
Constant	0.2366***	[0.1277,0.3456]	0.3352***	[0.2326,0.4378]
Average practice intercept	-2.6524***	[-2.7371,-2.5678]	-2.6089***	[-2.6924,-2.5254]
N	27938		19304	

Notes : Robust OLS used for Continuity of Care.

Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.25b: Average Marginal Effects of CCNC from Multi-Level and Fixed-Effects Models, by Primary Care Visits

	COC	
	Medium	High
CCNC		
MLM AME	0.003	- 0.0142
	[-0.018,0.023]	[-0.0310,0.0026]
FE AME	- 0.0050	-0.0158
	[-0.0289,0.0189]	[-0.0336,0.0020]

Notes : For multi-level models: robust OLS used for Continuity of Care. For fixed-effects models: Cluster-robust OLS for Continuity of Care

Contintinuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.26a: Multi-Level Estimates of the Moderating Effect of CCNC Patient Load on Yearly Health Care Utilization, by Primary Care Visits

	Continuity of Care			
	Medium (3-5)		High (>5)	
	Coeff.	95% CI	Coeff.	95% CI
CCNC Patients (omitted = Very Low)				
Low	0.0217	[-0.0028,0.0461]	0.0326**	[0.0094,0.0559]
	(AME = 0.0217)		(AME = 0.0326)	
Medium	0.0380**	[0.0125,0.0636]	0.0468***	[0.0227,0.0709]
	(AME = 0.0380)		(AME = 0.0468)	
High	0.0463**	[0.0184,0.0742]	0.0582***	[0.0331,0.0834]
	(AME = 0.0463)		(AME = 0.0582)	
Very High	0.0501***	[0.0239,0.0763]	0.0697***	[0.0457,0.0936]
	(AME = 0.0501)		(AME = 0.0697)	
CCNC Early Adopter	0.0100	[-0.0065,0.0265]	-0.0012	[-0.0178,0.0153]
Person-level controls				
Age	0.0157***	[0.0095,0.0219]	0.0084**	[0.0026,0.0143]
Age^2	-0.0002***	[-0.0002,-0.0001]	-0.0001**	[-0.0002,-0.0000]
Male	0.0953***	[0.0839,0.1067]	0.0596***	[0.0441,0.0751]
Charlson Index	-0.0744***	[-0.0841,-0.0647]	-0.0572***	[-0.0673,-0.0471]
Charlson Index^2	0.0040***	[0.0024,0.0056]	0.0034***	[0.0025,0.0043]
Eligibility (omitted = subscriber)				
Spouse	-0.0139	[-0.0322,0.0045]	-0.0360***	[-0.0543,-0.0177]
Other	0.0460	[-0.0566,0.1486]	-0.0258	[-0.1429,0.0912]
Plan Type (omitted = CMM)				
Smart Choice	-0.0166	[-0.0465,0.0134]	0.0086	[-0.0189,0.0361]
Smart Choice Basic	0.0144	[-0.0174,0.0463]	0.0418**	[0.0131,0.0705]
Smart Choice Plus	-0.0642**	[-0.1038,-0.0246]	0.0047	[-0.0301,0.0395]
Practice and county-level controls				
# Primary Care Providers	-0.0008	[-0.0019,0.0002]	-0.0005	[-0.0011,0.0002]
Multisite Practice	-0.0086	[-0.1205,0.1032]	0.0035	[-0.0709,0.0779]
Rural-Urban				
Non-urban, Non-rural	0.0253**	[0.0063,0.0443]	0.0132	[-0.0055,0.0319]
Rural	0.0589**	[0.0182,0.0997]	0.0832***	[0.0441,0.1222]
Community-based Practice	-0.0012	[-0.0390,0.0365]	-0.0238	[-0.0551,0.0075]
County Proportion Poverty	-0.0766	[-0.2937,0.1405]	-0.1603	[-0.3743,0.0538]
Primary Care Providers/10,000 Population	0.0004	[-0.0021,0.0028]	0.0006	[-0.0010,0.0021]
County Proportion Race/Ethnicity				
Non-white, not Hispanic	0.0344	[-0.0248,0.0935]	0.0120	[-0.0489,0.0729]
Hispanic	0.0505	[-0.0564,0.1575]	0.0436	[-0.0762,0.1633]
Year				
2005	-0.0188	[-0.0547,0.0172]	-0.0454**	[-0.0796,-0.0113]
2006	-0.0248	[-0.0600,0.0103]	-0.0436*	[-0.0775,-0.0096]
2007	-0.0511**	[-0.0861,-0.0160]	-0.0655***	[-0.0977,-0.0334]
2008	-0.0569**	[-0.0935,-0.0203]	-0.0780***	[-0.1113,-0.0446]
Constant	0.2391**	[0.0773,0.4008]	0.3873***	[0.2423,0.5323]
Average practice intercept	-2.7666***	[-2.9020,-2.6312]	-2.8144***	[-2.9507,-2.6781]
N	13024		8901	

Notes : Robust OLS used for Continuity of Care.
Continuity of Care models only for patients with >=3 OP visits during the year.
*p<0.05,**p<0.01,***p<0.001

Table 5.26b: Average Marginal Moderating Effects of CCNC Patient Load from Multi-Level and Fixed-Effects Models, by Primary Care Visits

	COC	
	Medium	High
CCNC Patients (omitted=Very Low)		
Low		
MLM AME	0.0217	0.0326**
	[-0.0027,0.0461]	[0.0085,0.0567]
FE AME	- 0.001	- 0.001
	[-0.057,0.055]	[-0.057,0.054]
Medium		
MLM AME	0.038**	0.047**
	[0.015,0.061]	[0.018,0.076]
FE AME	0.003	-0.030
	[-0.067,0.074]	[-0.093,0.033]
High		
MLM AME	0.046**	0.058**
	[0.014,0.078]	[0.027,0.090]
FE AME	- 0.020	- 0.026
	[-0.097,0.058]	[-0.098,0.046]
Very High		
MLM AME	0.050**	0.070**
	[0.022,0.078]	[0.042,0.097]
FE AME	-0.027	-0.013
	[-0.110,0.057]	[-0.086, 0.061]

Notes : For multi-level models: robust OLS used for Continuity of Care. For fixed-effects models: Cluster-robust OLS for Continuity of Care

Contintinuity of Care. Continuity of Care models only for patients with >=3 OP visits during the year.

*p<0.05,**p<0.01,***p<0.001

Table 5.27: Median Odds Ratios

	Median Odds Ratio - CCNC Models	Median Odds Ratio - CCNC Patient Load Models
>=1 A1C	3.56	3.87
>=1 LDL	3.18	3.39
>=1 Eye Exam	1.34	1.31
Attention for Nephropathy	1.78	1.76
>=1 Flu Shot	1.58	—
>=1 Breast Cancer Screen	1.59	—
>=1 Cervical Cancer Screen	1.79	—
>=1 IP Admission	1.29	1.19
>=1 ED Visit	1.40	1.40
# PCP Visits	1.42	1.34
# Total OP Visits	1.31	1.27
Continuity of Care	1.29	1.27

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